JVC

Service Manual

VIDEO CASSETTE RECORDER

MODEL CR-8250E

MODEL CR-6650E

VIDEO CASSETTE PLAYER

MODEL CP-5550E

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

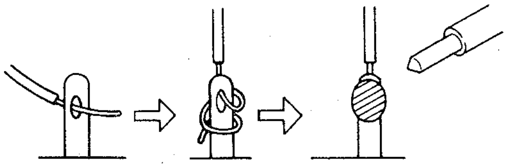


Fig. 1

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

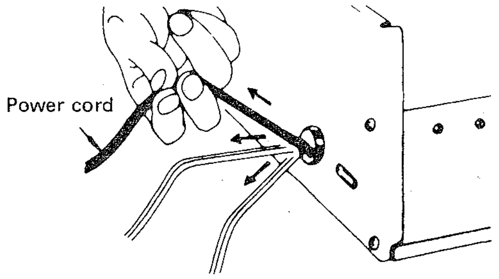


Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

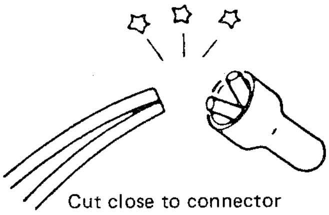


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

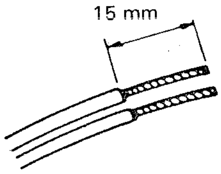


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

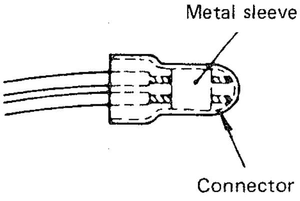


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

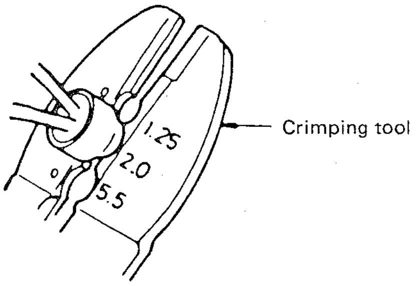


Fig. 6

(5) Check the four points noted in Fig. 7.

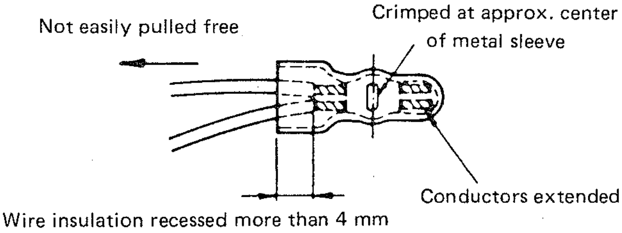

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

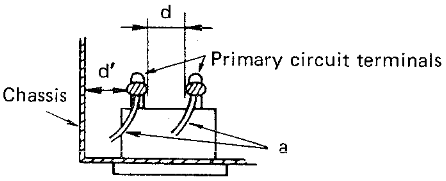


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

   Measuring Method: (Power ON)
   Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

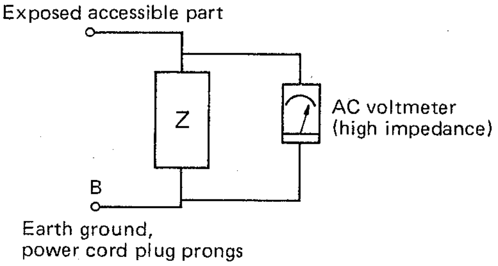


Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 mΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	–	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 mΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

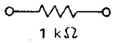
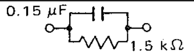
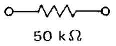
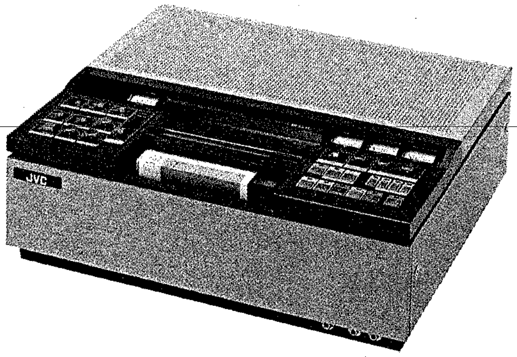
AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	 1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	 0.15 μF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		 50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

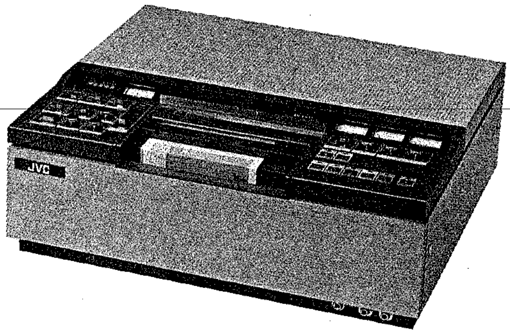
Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

No. 8271

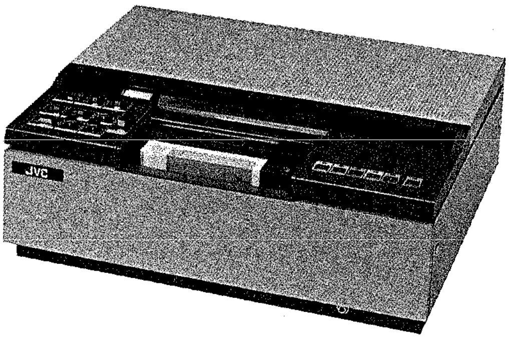
JVC Service Manual



MODEL **CR-8250E**



MODEL **CR-6650E**



MODEL **CP-5550E**

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Printed in Japan

CR-6650E

INSTRUCTIONS
MANUEL D'INSTRUCTIONS
BEDIENUNGSANLEITUNG

For reference, the text of the instruction booklet of this model is reproduced in the following pages.
Numbering of the pages also corresponds with that of the booklet.

CR-6650E
COLOUR VIDEO CASSETTE RECORDER

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

Warning Notice
FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core correctly wired.

FOR YOUR SAFETY

Install any external aerial to AS 1417.1

WARNING—THIS APPARATUS MUST BE EARTHED
IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-and-YELLOW:	EARTH
BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

POWER SYSTEM

Connection to the mains supply

The operating voltage of this set is preset to 240 V∿ at the factory.

Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting to local power line

This set operates on either 110, 127, 220 or 240 V∿.

If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector and turning it until the correct voltage is displayed.

CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

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PRECAUTIONS

Handling and storage

- Avoid using the CR-6650E under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibration, and
  - poorly ventilated places.
- Be careful about moisture condensation.
  Avoid using the CR-6650E soon after moving from a cold place to a warm place or soon after heating a room which was cold. Water vapor in the warm air will condense on the still-cold video head drum and tape guides and this moisture may cause damage to the tape and the recorder.
- Handle the CR-6650E carefully.
  - Do not place the provided dust cover on the recorder while it is being used.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause internal damage on top of the recorder.
  - Use in horizontal position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

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Printed in Japan

Video cassettes

- Use KCA series 3/4'' U-standard video cassettes. However, the smaller KCS-20 cassettes can also be used with this recorder. To insert the KCS-20 cassette into this recorder, match the cassette's guide groove with the guide ridge on the cassette holder.
- Before recording or editing, make sure that the red cap is in place on the reverse side of the cassette. Without this cap, recording and editing are impossible. Remove this cap when you want to protect the recording against accidental erasure.

FEATURES

Direct drive head drum and capstan motors

The head drum and capstan are driven by brushless direct-drive DC motors for excellent stability and durability.

Aluminum diecast chassis for high reliability and durability

The high reliability and high durability of the tape control mechanism are assured by the aluminum diecast chassis, the two-motor gear-driven tape loading system and the power-elevated cassette eject mechanism.

Reel servo system with independent reel motors

The stability of tape transport is enhanced by independent supply and take-up reel motors and the reel servo system which keeps tape tension constant not only during recording and playback but also during fast forward and rewind, so that there is no overload on the tape at low or high speed.

FM-FM dubbing for improved copies

The FM-FM dubbing system in which the signals are transferred in the form of FM signals reduces degradation of picture quality, making the CR-6650E ideal for use as a master VTR for video software production and in copying.

Professional standard connectors

BNC connectors are used for the input and output of video signals and 3-pin balanced XLR connectors are used for the input and output of audio signals.

H-Phase control

So that the CR-6650E can be synchronized precisely with the horizontal phase of the player for more accurate editing, it is provided with a horizontal phase control.

Video level meter and video level control

The level of the video signal being recorded on the tape is displayed so that the video recording current can be optimized.

Tracking meter

So that tracking can be adjusted accurately, the CR-6650E is equipped with an independent tracking meter.

Variable-speed dial search control

The playback speed can be varied continuously from zero (still) to 5 times normal speed in both the forward and reverse directions using the rotary dial on the optional editing control unit.

Microprocessor-based logic control

The logic control system using a microprocessor permits direct changeover between modes; it is not necessary to press the stop button first. This facility also makes possible full remote control over all operation modes.

Capstan servo system for external lock

The capstan servo system permits playback to be locked to external sync signals. The external subcarrier input terminal also enables connection of a time base corrector (TBC).

Automatic pre-roll function

When the PAUSE button is pressed during recording, the tape automatically pre-rolls and stops after being rewound by about 2 seconds of programme time.

Electronic real-time tape counter

The tape counter is electronically controlled and employs fluorescent tubes for a clear, easy-to-read display. Displaying elapsed time up to 59 min 59 sec, it facilitates the indexing of recordings.

Automatic search mechanism

This permits the automatic location of any particular section of tape when used together with the tape counter.

Automatic repeat mechanism

When the auto repeat mode is selected, the tape is automatically rewound to the beginning from which point it is played back again.

Audio level control with meters

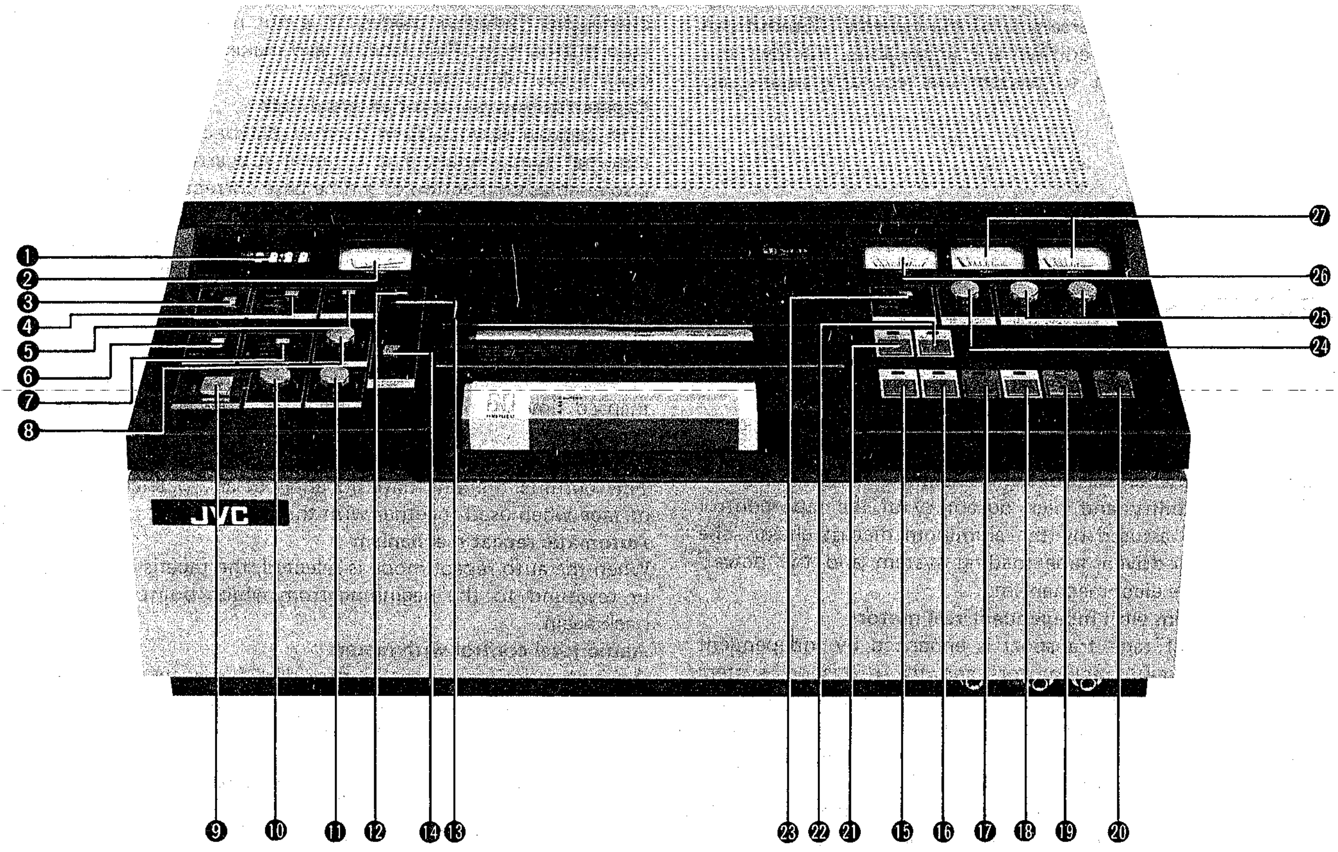
An audio limiter circuit is provided for each channel, preventing over-level recording. In the manual recording level control mode, the recording level is adjusted referring to the level meters.

Standby mode incorporated for more convenient operation

When the STOP button is pressed from any mode, the Standby mode is engaged and, since the tape remains loaded around the head drum on standby, either the Play or Record mode can be immediately entered.

CONTROLS AND CONNECTORS

CONTROL PANEL



❶ **Tape counter**
This 4-digit real-time tape counter shows the amount of tape that has run up to 59 min 59 sec.

❷ **TRACKING meter**
When adjusting tracking, turn the TRACKING control ❽ so that the needle of this meter makes its maximum deflection.

❸ **COUNTER RESET button**
To reset the tape counter to "00:00".

❹ **AUTO MODE switch**
This switch selects automatic operations specifically related to rewinding.

SEARCH:	The tape stops automatically when it is rewound to the point corresponding to the counter reading of "00:00" and the unit enters the STOP mode.
OFF:	No automatic operation.
REPEAT:	When the tape is rewound to its beginning, it stops and then is reloaded automatically to repeat playback.

❺ **SYNC select switch**
For selecting between different reference sync signals for the servo systems during recording and playback. For more information refer to "REFERENCE SYNC SIGNALS FOR RECORDING AND PLAYBACK" on page 14.

❻ **AUDIO MONITOR select switch**
This switch selects the audio output available from the 8-pin TV connector, headphone jack or AUDIO MONITOR connector.

AUDIO-1:	To hear channel-1 audio.
MIX:	To hear a mixture of channel-1 and channel-2 audio.
AUDIO-2:	To hear channel-2 audio.

⑦ **VIDEO MODE select switch**

Select one of the three positions according to the input signal during recording or the output signal during playback.

COLOR: Set to this position when the input or playback video signal is a colour signal.

AUTO: The circuit is automatically switched between colour and black/white, allowing optimum recording or playback. When this position is used with black/white signals, a higher picture resolution can be obtained. Normally set this switch at this position.

B/W: Set to this position when the input or playback signal is a monochrome signal. Higher picture resolution will be obtained.

- An LED indicator is provided to prevent recording colour signals in black and white by mistake. This LED lights when the switch is set to B/W.

⑧ **TRACKING control**

To remove noise bars during playback, turn this control so that the TRACKING meter ② makes its maximum deflection.

⑨ **POWER switch**

Press to turn the power on. The level meters and the counter display will be illuminated. Pressing again will switch the power off.

⑩ **SKEW control**

Turn this control to correct the playback picture if the upper part is bent horizontally.

⑪ **H-PHASE control**

Use to align the horizontal phase of the CR-6650E to that of the connected player for more accurate editing. When the recorder and player becomes in phase, the LED indicator lights.

⑫ **WARNING indicator**

This LED lights in the following cases, and all operations are brought to a halt;

1) When the tape transport does not function properly and no tape is supplied or taken up,
2) When the tape-end detection lamp is disconnected,
3) When the drum motor stops, and
4) When the condensation sensor operates.

- When this LED lights, immediately switch off the power.

⑬ **SERVO LOCK indicator**

Lights when the servo system is locked for normal operation.

⑭ **COMPARTMENT RETRACT lever**

Push back to lower the empty cassette compartment. When the recorder is not in use, the cassette compartment should be in the retracted position.

- Use this lever only to retract the empty cassette compartment, not for inserting a cassette.

⑮ **Fast forward button (FF)**

This functions in two ways; for fast forward and forward search. This button can be pressed from any mode except Record; when it is pressed in the Play mode, the forward search is engaged with the tape running at about 15 times normal speed. In either case, fast forward or search, the FF indicator will light. To release the FF or Search mode, press any button except REC or EJECT corresponding to the mode you wish to enter next.

⑯ **Rewind button (REW)**

This functions in two ways; for rewind and reverse search. This button can be pressed from any mode except Record; when it is pressed in the Play mode, the reverse search is engaged with the tape running at about 15 times normal speed. In either case, rewind or reverse search, the REW indicator will light. To release the REW or Search mode, press any button except REC or EJECT corresponding to the mode you wish to enter next.

⑰ **PLAY button**

Press to start playback. The PLAY indicator will light. Press together with the REC button to start recording. The PLAY button can be pressed directly from the FF or REW mode without pressing the STOP button.

⑱ **PAUSE/STILL button**

Press to stop the tape temporarily during recording or playback. To release the Pause or Still mode, press any button except EJECT corresponding to the mode you wish to enter next. If the STOP button is pressed from any mode other than Standby, the PAUSE/STILL and STOP indicators will light and the recorder will enter the Standby mode.

⑲ **STOP button**

When a cassette is inserted, the tape is partially loaded automatically and stopped (this state is referred to as the Stop mode). The STOP indicator remains lighted.

Press the STOP button once to engage the Standby mode from any other mode. To enter the Stop mode, press the STOP button once again.

⑳ **EJECT button**

Press to eject the cassette. Ejection of the cassette can only be done from the Stop or Standby mode. When the EJECT button is pressed after the STOP button has been pressed, the LED indicator above the EJECT button will start flashing. After the completion of tape unloading, the cassette is automatically ejected.

㉑ **Record button (REC)**

Press together with the PLAY button to start recording the video and audio signals. When the REC button is pressed during playback, the monitor screen switches from the playback picture to the E-E mode picture, allowing you to monitor the signals applied to the input terminals.

㉒ **AUDIO-1 DUB button**

Channel-1 soundtrack can be dubbed. For audio dubbing, press this button together with the PLAY button.

㉓ **INPUT select switch**

TV: Set to this position to record signals input via the 8-pin TV connector. In this case, the audio signal is recorded on the channel-2 audio track.

LINE: Set to this position when you record signals input via the VIDEO IN and AUDIO IN (CH-1, CH-2) connectors or from the MIC (CH-1, CH-2) jacks.

FM DUB: Set to this position to use FM-FM dubbing.

- In this position, sound signals input via the AUDIO IN connectors or MIC jacks can be recorded.

- When the CR-6650E is used as a player for FM-FM dubbing, this switch should be set to LINE.

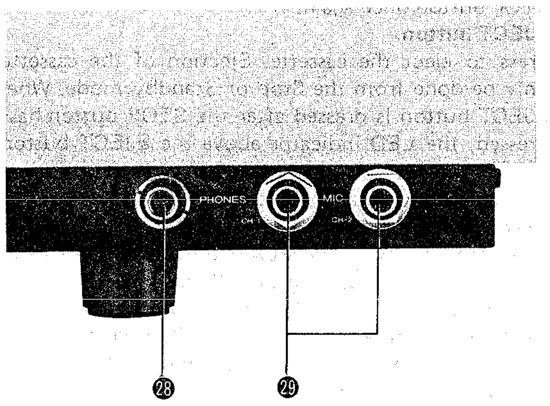
㉔ **VIDEO REC LEVEL control/AGC switch**
With this control in its in (pressed) position, the built-in AGC circuit is activated. When the control is pulled outward, manual video level control is possible by turning this control referring to the VIDEO level meter ㉖

㉕ **AUDIO REC LEVEL controls/LIMITER switches**
For manual recording level control, pull the control knobs outward and turn them for optimum recording. Pressing them in switches the audio limiter circuit ON, preventing distorted sound even when the peak input signals momentarily exceed the reference level. In this state, manual control does not function.

㉖ **VIDEO level meter**
This meter indicates the video recording level. For manual control, turn the VIDEO REC LEVEL control so that the meter needle deflects into the green area.

㉗ **Audio level meters (AUDIO-1, AUDIO-2)**
These meters indicate the audio level during recording and playback. For manual level control, adjust so that the maximum peak level is about +3 dB.

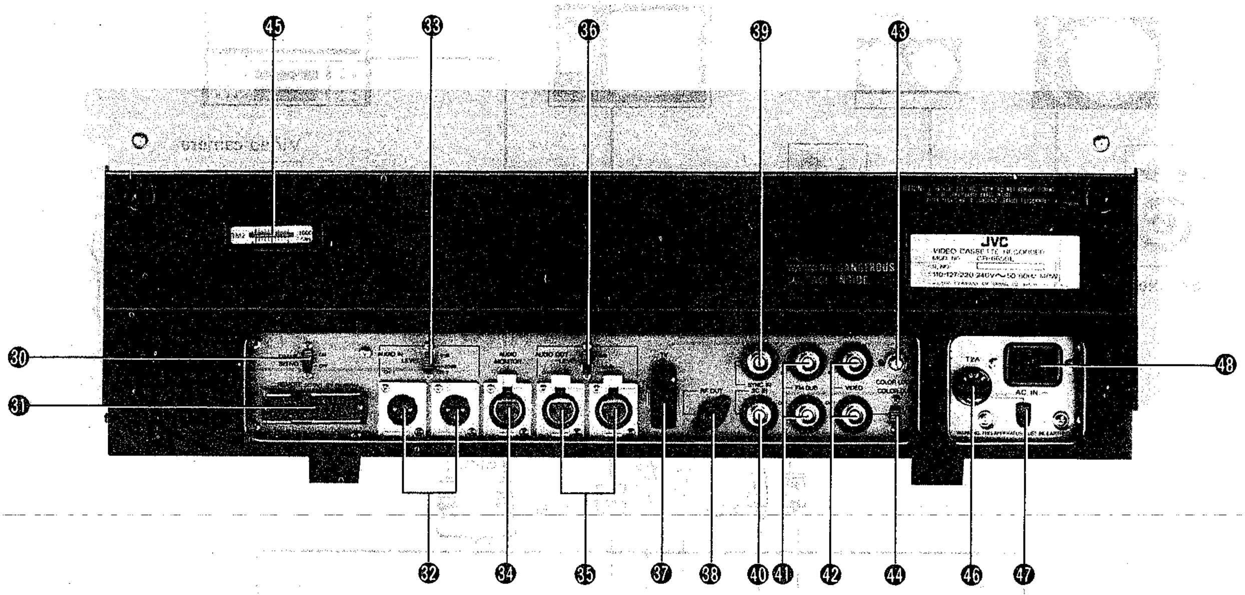
FRONT PANEL



㉘ **Headphone jack (PHONES)**
Connect a set of headphones having an impedance of 8 ohms. The audio channel selected by the AUDIO MONITOR select switch ⑥ can be heard.

㉙ **Microphone jacks (MIC CH-1, CH-2)**
Connect microphones having an impedance of 600 ohms and a sensitivity of –70 dBm. When microphones are plugged in, the line input is automatically switched off.

REAR PANEL



㉚ **FRAME SERVO switch**
Normally set this switch to ON. However, when tapes containing random interlaced or low S/N video signals are used, set it to OFF.

㉛ **REMOTE control connector**
Connect a JVC remote control unit.

㉜ **Audio line input connectors (AUDIO IN, CH-1, CH-2)**
Audio input connectors for audio channel-1 and channel-2.

㉝ **Audio input level select switch (AUDIO IN LEVEL)**
Select either 0 dB or -20 dB according to the level of the audio input signal. The level is switched for both audio channels simultaneously.

㉞ **AUDIO MONITOR output connector**
The audio signal selected by the AUDIO MONITOR switch is present at this connector.

㉟ **Audio line output connectors (AUDIO OUT CH-1, CH-2)**
Output connectors for audio channel-1 and channel-2.

㊱ **Audio output level select switch (AUDIO OUT LEVEL)**
Select either 0 dB or -20 dB according to the level of the audio output signal. The level is switched for both audio channels simultaneously.

㊲ **TV monitor connector (TV)**
This is an 8-pin input/output connector for the connection of a TV monitor. The audio signal selected by the AUDIO MONITOR switch ❻ is present at the audio output terminal.

㊳ **RF OUT connector**
The output RF signal is available from this connector. Connect a regular TV receiver to view the video tape.

㊴ **External sync signal input connector (SYNC IN)**
This input connector accepts an external reference sync signal when the recorder is to be operated in the external sync mode. The external sync signal can be a composite sync signal or a composite video signal.

㊵ **Subcarrier input connector (SC IN)**
Input connector to accept external subcarrier signals such as from a time base corrector (TBC).

㊶ **FM dubbing connectors (FM DUB IN/OUT)**
FM dubbing connectors for IN/OUT.

㊷ **Video line connectors (VIDEO IN/OUT)**
Line input/output connectors for video signal.

㊸ **COLOR LOCK control**
Turn to correct playback pictures if they lose colour or if there are erratic changes in colour.

㊹ **COLOR DUB switch**
When dubbing a tape recorded in colour to a 2nd recorder, set this switch to ON. This will improve the colour quality of the dubbed tape.

㊺ **Hour meter**
This indicates the total operating time. After 1,000 hours of operation, the red line moves to the right end of the scale.

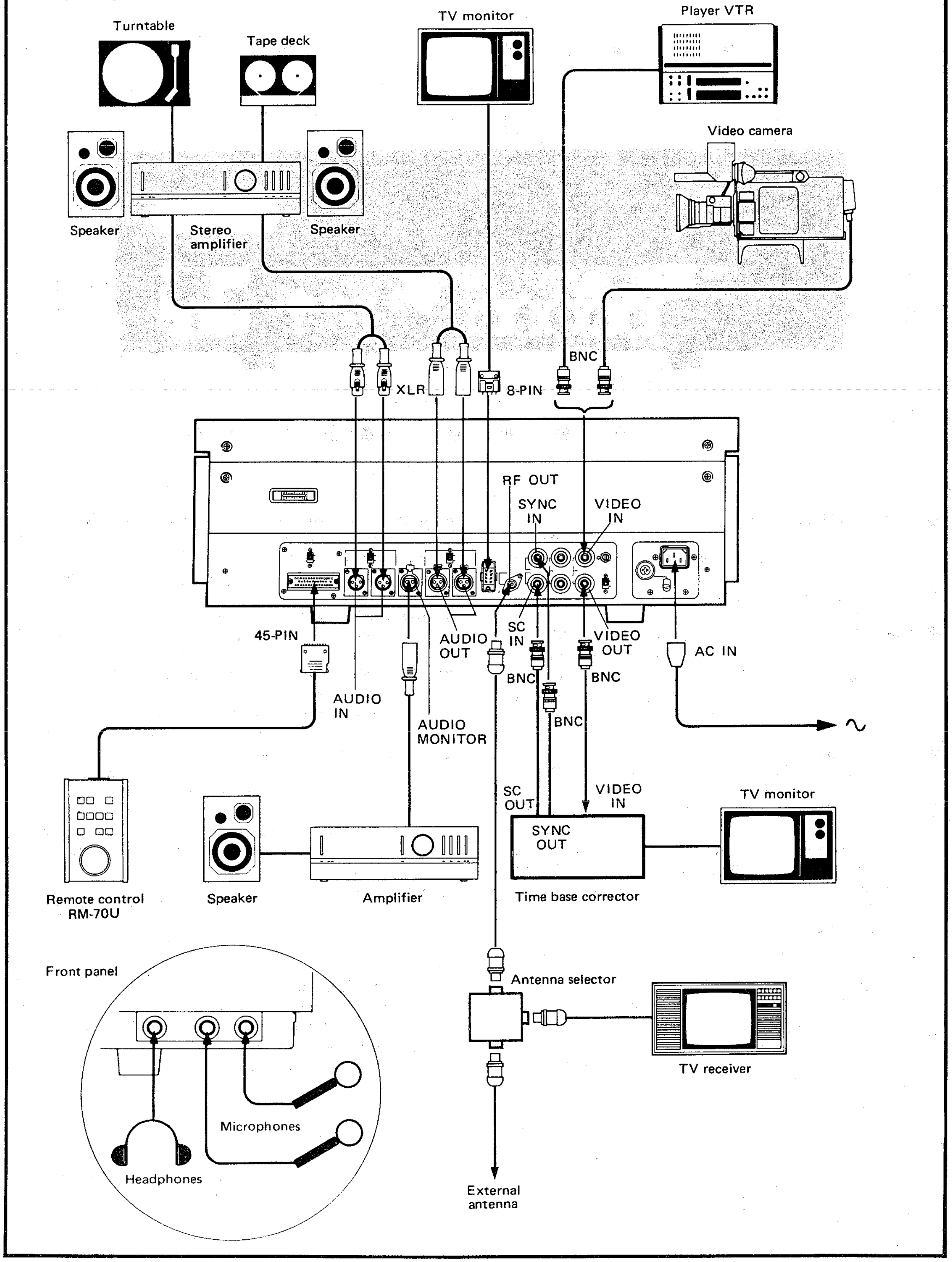
㊻ **Fuse**

㊼ **AC voltage selector**
Set to the power supply voltage in your area.
This set operates on either 110, 127, 220 or 240 V∿.

㊽ **AC input socket (AC IN)**

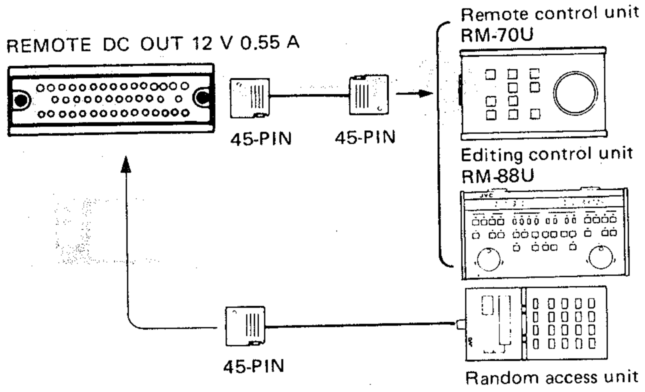
CONNECTIONS

VIDEO AND AUDIO EQUIPMENT CONNECTIONS

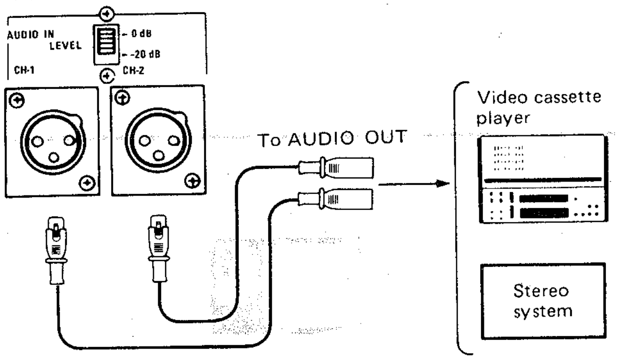


Turntable
Tape deck
TV monitor
Player VTR
Video camera
Speaker
Stereo amplifier
Speaker
BNC
XLR
8-PIN
RF OUT
SYNC IN
VIDEO IN
45-PIN
AUDIO OUT
SC IN
VIDEO OUT
AC IN
BNC
BNC
BNC
AUDIO IN
AUDIO MONITOR
SC OUT
VIDEO IN
SYNC OUT
TV monitor
Remote control RM-70U
Speaker
Amplifier
Time base corrector
Front panel
Antenna selector
TV receiver
Microphones
Headphones
External antenna

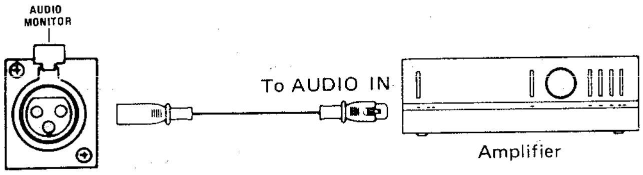
1. REMOTE control connector (45-PIN)


REMOTE DC OUT 12 V 0.55 A
45-PIN
45-PIN
Remote control unit RM-70U
Editing control unit RM-88U
45-PIN
Random access unit

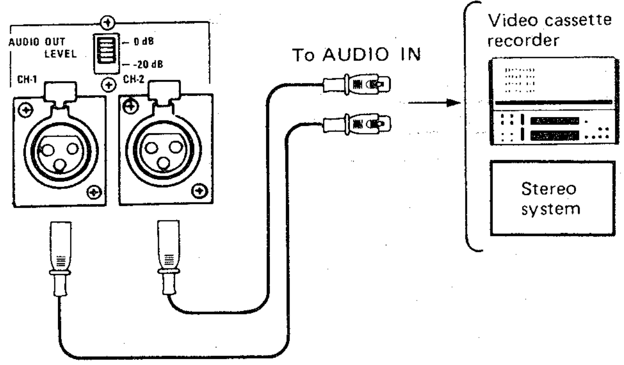
2. AUDIO IN (XLR)


AUDIO IN LEVEL
0 dB
-20 dB
CH-1
CH-2
To AUDIO OUT
Video cassette player
Stereo system

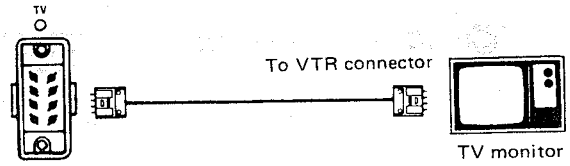
3. AUDIO MONITOR (XLR)


AUDIO MONITOR
To AUDIO IN
Amplifier

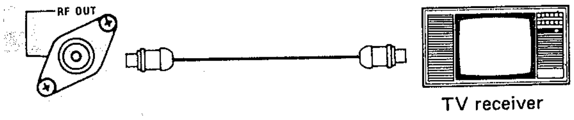
4. AUDIO OUT connector (XLR)


AUDIO OUT LEVEL
0 dB
-20 dB
CH-1
CH-2
To AUDIO IN
Video cassette recorder
Stereo system

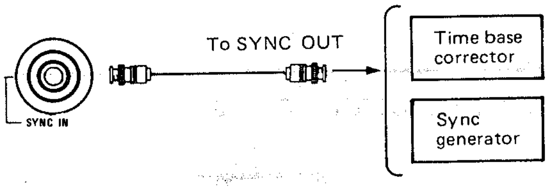
5. TV connector (8-PIN)


TV
To VTR connector
TV monitor

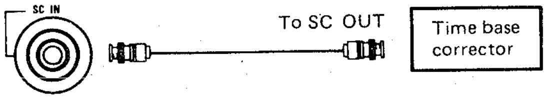
6. RF OUT connector (Aerial)


RF OUT
TV receiver

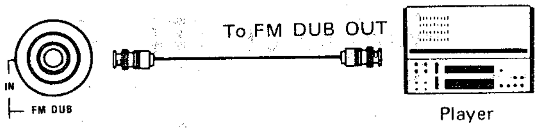
7. EXTERNAL SYNC IN connector (BNC)


SYNC IN
To SYNC OUT
Time base corrector
Sync generator

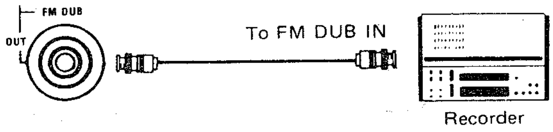
8. SC IN connector (BNC)


SC IN
To SC OUT
Time base corrector

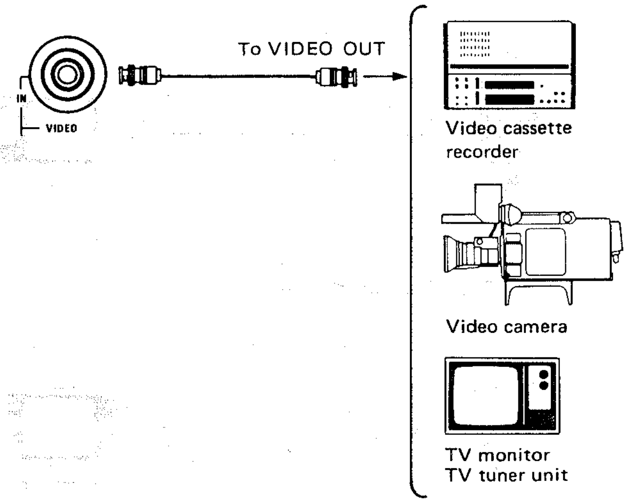
9. FM DUB IN connector (BNC)


IN
FM DUB
To FM DUB OUT
Player

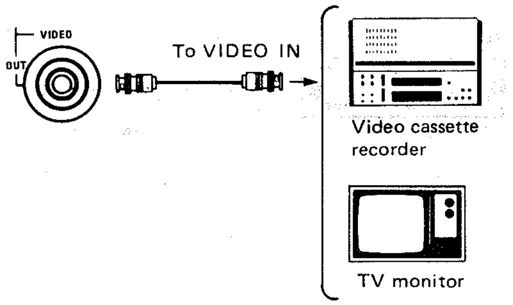
10. FM DUB OUT connector (BNC)


FM DUB
OUT
To FM DUB IN
Recorder

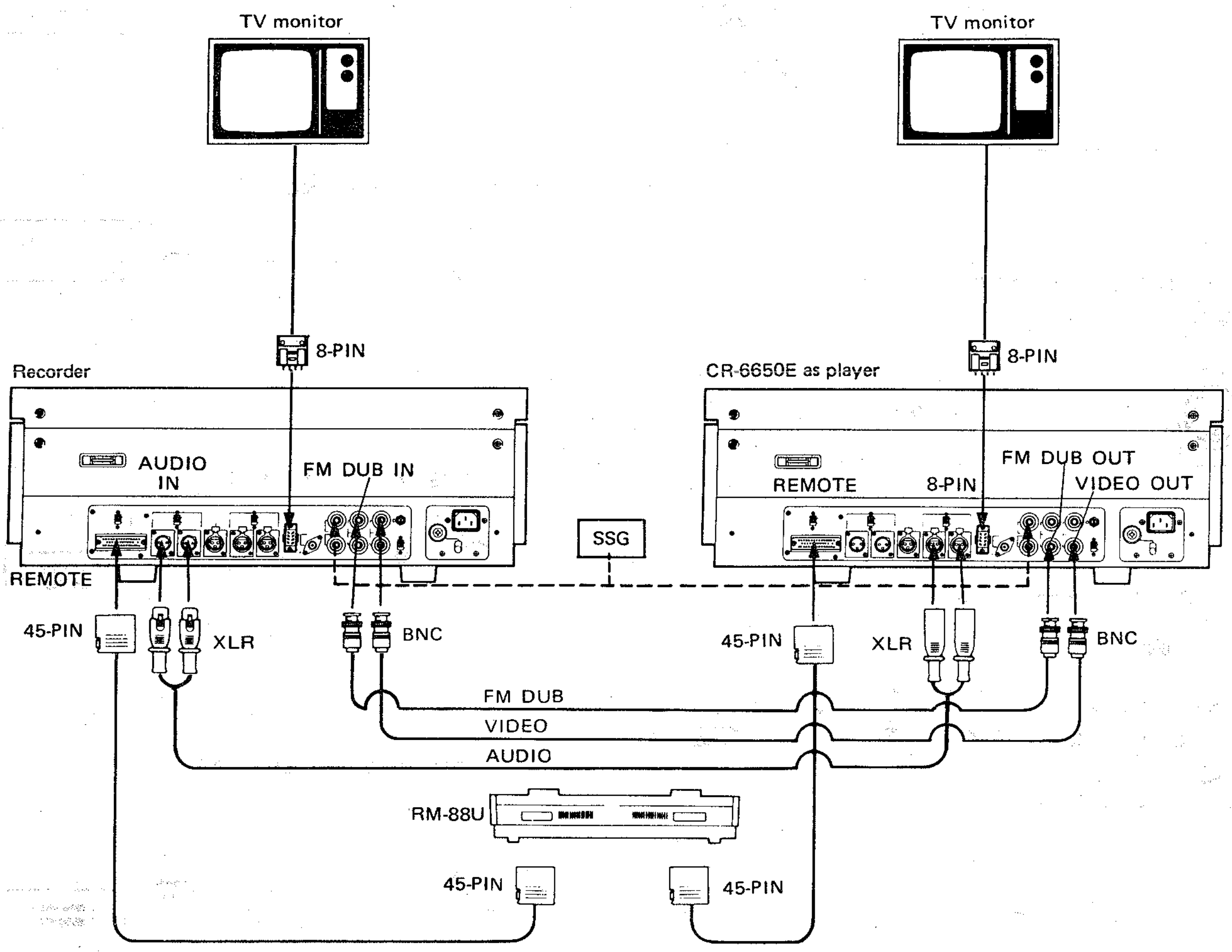
11. VIDEO IN connector (BNC)


IN
VIDEO
To VIDEO OUT
Video cassette recorder
Video camera
TV monitor
TV tuner unit

12. VIDEO OUT connector (BNC)


VIDEO
OUT
To VIDEO IN
Video cassette recorder
TV monitor

EDITING CONNECTIONS


TV monitor
TV monitor
8-PIN
8-PIN
Recorder
CR-6650E as player
AUDIO IN
FM DUB IN
REMOTE
8-PIN
FM DUB OUT
VIDEO OUT
SSG
REMOTE
45-PIN
XLR
BNC
45-PIN
XLR
BNC
FM DUB
VIDEO
AUDIO
RM-88U
45-PIN
45-PIN

INSERTING A VIDEO CASSETTE

1. Press the POWER button to ON.
2. Press the EJECT button: the cassette compartment will lift automatically.
   - If you are going to record or edit, make sure that the red cap is in place on the reverse side of the cassette. Without this cap, recording and editing are impossible. Remove this cap when you want to protect the recording against accidental erasure.
3. Insert the video cassette fully and correctly into the cassette compartment. The cassette compartment will automatically retract and the unit enters the Stop mode with the Stop LED indicator lit.
   - If the cassette compartment does not retract automatically, make sure the cassette is inserted correctly. Do not attempt to retract the cassette compartment (with a cassette inserted) using the COMPARTMENT RETRACT lever.

STANDBY MODE

After the unit enters the Stop mode, press the PAUSE/STILL and STOP buttons simultaneously to enter the Standby mode. In the Standby mode both the PAUSE/STILL and STOP indicators will light. To enter the Standby mode from any other mode, simply press the STOP button. Pressing the STOP button once again engages the Stop mode.

Note:

If power is switched off while the cassette compartment is lifting, the ejection does not continue even when power is switched on again. In order to lift the compartment completely, press the EJECT button once again after power has been reapplied.

PLAYBACK

PLAYBACK PROCEDURE

- Normally set the VIDEO MODE select switch to AUTO. If the recording is monochrome, you can set it to B/W. In this case, the B/W LED indicator will light.

1. Press the PLAY button. The Play LED indicator will light and playback starts.
2. Adjust the TRACKING and SKEW controls to optimize the playback picture.
   - If the playback picture colour is abnormal, correct it using the COLOR LOCK control on the rear panel.
   - If you wish to monitor the signal applied to the input connector during playback, press the REC button in the Play mode. The input signal will appear on the monitor screen.
   - Do not press the REC and PLAY buttons simultaneously, otherwise the unit will enter the Record mode and the recording on the tape will be erased.
3. If you wish to view a still picture, press the PAUSE/STILL button during playback. To release the Still mode, press the PLAY button.
   - When the tape reaches its end, it enters the Rewind mode.

Note:

When the Play mode is entered from the Stop mode, the picturn may roll and no colour may appear in the first 1 or 2 seconds. To avoid this happening, start playback from the Standby mode.

EXTERNAL-LOCK PLAYBACK

When playback is to be locked to an external sync signal, proceed as follows:

1. Apply a reference sync signal to the SYNC IN connector. Use a composite sync signal or a composite video signal as the reference signal.
2. Set the SYNC select switch to EXT.
3. Press the PLAY button to start playback.

PLAYBACK USING A TV RECEIVER VIA AN RF CONVERTER

With the adoption of an optional RF converter, the CR-6650E is capable of playing back tape with a TV receiver. For installing the RF converter, consult your JVC dealer.

When you employ an RF converter for playback with a TV receiver, it is necessary to set the channel selector of the TV receiver to the same channel to which the RF converter is adjusted.

RF Converter Model	Area	Channel
KR-250EG	Continental Europe*	CH 43–47 on the UHF band Continental Europe standard
KR-250EK	United Kingdom	CH 43–47 on the UHF band United Kingdom standard

* Except France

Note:

- The RF Converter Model KR-250EG/250EK can be adjusted for channels 43 through 47. Insert a screwdriver into hole No. 3 of the RF Converter. Turning this clockwise will increase the frequency to which the converter is tuned.

REPEATED PLAYBACK

When the whole tape, from the beginning to the end, is to be repeated, proceed as follows:

1. Set the AUTO MODE select switch to REPEAT.
2. Press the PLAY button to start playback.

When the tape reaches its end, it is rewound to the beginning and then it is played back automatically. This procedure is repeated as many times as desired.

REWINDING AND SHUTTLE SEARCH

- Press the REW button. The Rewind mode is entered and the Rewind LED indicator lights.
- When the REW button is pressed in the Stop mode, the Rewind mode is entered. When the REW button is pressed in the Play or Still mode, the Reverse Search mode is entered.

FAST FORWARDING AND SHUTTLE SEARCH

- Press the FF button. The Fast Forward mode is entered and the FF LED indicator lights.
- When the FF button is pressed in the Stop mode, the Fast Forward mode is entered. When the FF button is pressed in the Play or Still mode, the FWD Search mode is entered.

Note:
The search speed is about 15 times the normal tape speed. When an optional remote control unit is used, the search speed can be varied continuously from zero to 5 times normal speed by turning the remote control unit's search dial and the Search mode, at 15 times normal speed, can be attained when the search dial is fully turned in the direction of increasing speeds. The picture may roll during search in either direction if the speed exceeds 5 times normal.

COUNTER SEARCH

1. Reset the tape counter to "00:00" at the starting point of recording, or at the point from which you wish to play back again.
2. Set the AUTO MODE select switch to SEARCH.
3. When you wish to rewind or fast forward the tape to the point where the counter was reset, press the REW or FF button.
4. When the counter reading of "00:00" is reached, the tape stops automatically and the Standby mode is entered.

Note:
The tape may sometimes run over "00:00" for 3 to 5 seconds.

AUTOMATIC REWINDING

When the tape is fully wound to the end in the Play or Record mode, it is automatically rewound to the beginning and enters the Standby mode. The counter search and repeated playback functions are operative also during this automatic rewinding. When the tape is fully wound to the end in the Fast Forward mode, the Standby mode is entered automatically.

RECORDING

RECORDING PROCEDURE

1. Normally set the VIDEO MODE select switch to AUTO. When making a point to record black/white signals, set it to B/W. In this case, the B/W LED indicator will light.
2. Normally set the SYNC select switch to VIDEO.
3. Set the INPUT select switch as required.
   LINE: Set to this position when recording video signals from the VIDEO IN connector and audio signals from either the AUDIO IN connectors or the MIC jacks.
   - When a microphone is plugged in, the input signal from the AUDIO IN connector is automatically disconnected and sound from the MIC jack is recorded.

   TV: Set to this position when recording signals from the 8-pin TV connector. The audio signal is recorded on the channel-2 audio track.
   FM DUB: Select this position for FM-FM dubbing. For details of FM-FM dubbing, refer to page 13.
4. Press the PLAY and REC buttons simultaneously to enter the Record mode. By adjusting the VIDEO LEVEL control, recording can be performed at optimum recording level.
5. Press the STOP button to stop recording.

Note:
When the Record mode is entered from the Still mode at the very beginning of the tape, it may occur that the Record mode will not engage, but the tape pre-rolls and stops again in the Still mode. In such a case, first press the PLAY button and then enter the Record mode, or continue holding both the PLAY and REC buttons pressed for about 3 seconds.

EXTERNAL-LOCK RECORDING

In order to record video signals synchronized with an external sync signal, proceed as follows:

1. Apply an external sync signal to the SYNC IN connector.
2. Set the SYNC select switch to EXT.
3. Apply the video signals to be recorded to the VIDEO IN connector.
4. Set the INPUT select switch to LINE.
5. Press the PLAY and REC buttons simultaneously to enter the Record mode.

- If the input video signal is not phase-locked to the external sync signal, distortion, caused by the switching points of the video heads, will appear in the playback picture of recordings made according to procedures outlined above.
- External-lock recording is also possible during dubbing. For this purpose, apply the same external sync signal to the SYNC IN connectors of both the player and recorder and set the SYNC select switches of both the player and recorder to EXT.

TAPE DUBBING

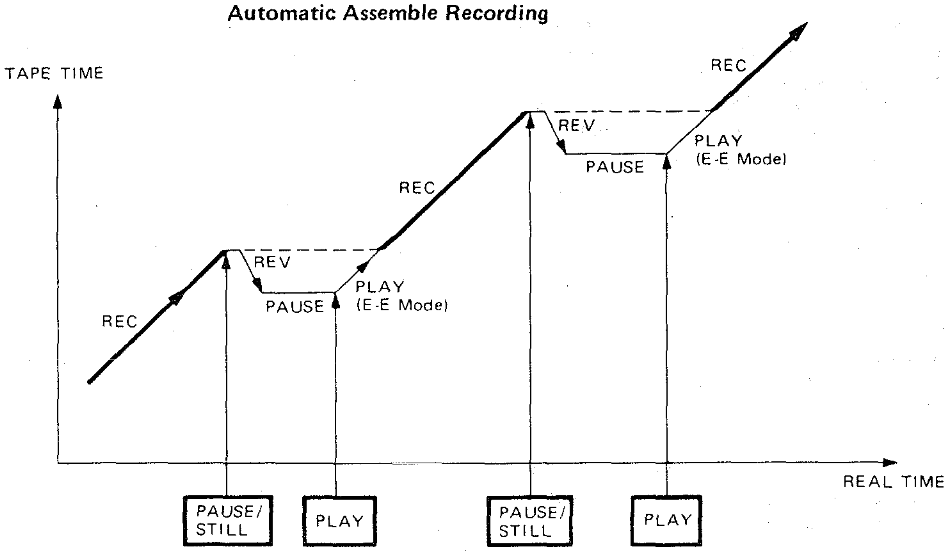
1. Connect the player and the recorder with each other according to instructions described on page 9.
2. If you wish to drive the player locked to an external sync signal, set the SYNC select switch of the player to EXT.
3. Set the SYNC select switch of the recorder to VIDEO.
4. Set the INPUT select switch of the recorder as required.
   LINE: Set to this position for VIDEO-VIDEO dubbing.
   FM DUB: Set to this position for FM-FM dubbing.
   - Even when FM-FM dubbing is to be performed, be sure to connect the VIDEO OUT connector of the player to the VIDEO IN connector of the recorder in the same way as for VIDEO-VIDEO dubbing.
5. Put the player in the Play mode and the recorder in the Record mode.

PAUSE CONTROL AND ASSEMBLE-RECORDING

If you wish to stop recording temporarily and re-start recording immediately following the end of the previous recording, employ the PAUSE/STILL button in the following manner. This will produce assembled recordings with no distortion between recorded segments.

1. Press the PAUSE/STILL button during recording. The Record mode is released (with the Record LED remaining lighted) and the tape stops in the Pause mode after being automatically rewound by about 2 seconds of program time. By pressing the PAUSE/STILL button once again at this point, the recorded picture can be viewed on the monitor screen, though sometimes it will be in monochrome.
2. To re-start recording, press the PLAY button. First the Play mode is entered (however, the output signal is not the tape playback signal, but the input signal to be recorded). When playback proceeds to the point where the previously recorded segment was stopped with the PAUSE/STILL button (it takes about 2 seconds), the Play mode is automatically switched to the Record mode.

Automatic Assemble Recording



FM-FM DUBBING

With video cassette recorders, the video signal is first converted into a frequency-modulated signal (FM signal) and recorded on the tape. During playback, this FM signal is picked up from the tape and demodulated into the original video signal. Therefore, when certain recordings on one tape are played back and re-recorded onto another tape (either in dubbing or editing), the actual process taking place is as follows: the player picks up the FM signal from the tape, returns it to the original video signal through demodulation and transmits the video signal to the recorder, while the recorder accepts this video signal, converts it into the FM signal and records it on the tape.

However, in the FM-FM dubbing system, the player transmits the FM signal as picked up from the tape, without demodulating it, and the recorder directly records the FM signal on the tape. This means that in the FM-FM dubbing system the process of modulating and demodulating is omitted, thus eliminating any deterioration of picture quality inherent in this process. Therefore, FM-FM dubbing produces dupes of better picture quality compared with the ordinary dubbing system (VIDEO-VIDEO dubbing).

It is essential in both VIDEO-VIDEO and FM-FM dubbing that the servo systems of the recorder be synchronized with the signal being recorded. For this purpose, VIDEO-VIDEO dubbing employs a vertical sync signal which can be separated from the input video signal as a reference signal for the servo systems. However, in FM-FM dubbing, it is difficult to separate the vertical sync signal from the input FM signal. This necessitates the application of a separate reference sync signal. The following two methods are available for this purpose:

1. Apply the demodulated video signal from the player (the output signal at the VIDEO OUT connector of the player) to the VIDEO IN connector of the recorder. In this case, the SYNC select switch of the recorder should be set to VIDEO.
2. Apply the same external sync signal to the SYNC IN connectors of both the player and recorder. In this case, the SYNC select switches of both the player and recorder should be set to EXT.

Note:

- When the INPUT select switch is set to FM DUB, the VIDEO level meter indicates the level of the input signal supplied to the VIDEO IN connectors.

AUDIO DUBBING

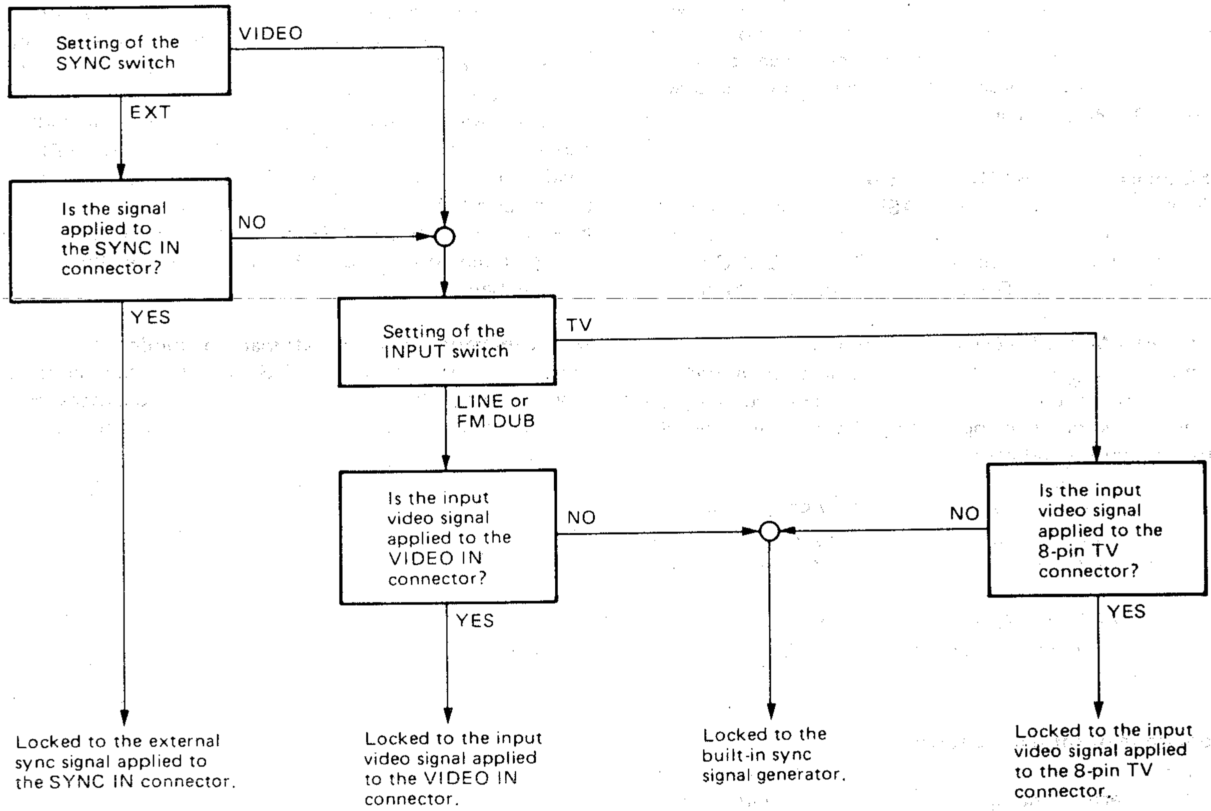
If you wish to record only audio while playing back the pre-recorded tape, employ the audio dubbing facility. Sound from a source connected to the CH-1 AUDIO IN connector or the CH-1 MIC jack can be recorded on the channel-1 audio track.

1. Connect a source to the relevant connector.
2. Press the AUD-1 DUB button together with the PLAY button to start audio dubbing.
3. To stop audio dubbing, press the STOP button.

- The pause function facilitates audio dubbing. First play back the pre-recorded tape and press the PAUSE/STILL button at the point from which you wish to start audio dubbing. Then press the AUD-1 DUB and PLAY buttons simultaneously. This permits you to start audio dubbing exactly at the right point.
- Both the sound being recorded and the channel-2 soundtrack can be monitored by switching with the AUDIO MONITOR select switch, through the PHONES or AUDIO MONITOR jack.

REFERENCE SYNC SIGNALS FOR RECORDING AND PLAYBACK

The reference sync signal for the servo systems during recording and playback differs as illustrated below, depending on the settings of the SYNC and INPUT select switches and the conditions of the signals applied to the input terminals.


Setting of the SYNC switch
VIDEO
EXT
Is the signal applied to the SYNC IN connector?
NO
YES
Setting of the INPUT switch
TV
LINE or FM DUB
Is the input video signal applied to the VIDEO IN connector?
NO
YES
Is the input video signal applied to the 8-pin TV connector?
NO
YES
Locked to the external sync signal applied to the SYNC IN connector.
Locked to the input video signal applied to the VIDEO IN connector.
Locked to the built-in sync signal generator.
Locked to the input video signal applied to the 8-pin TV connector.

OPERATING PRECAUTIONS WHEN USED IN AN EDITING CONFIGURATION

H-phase adjustment

For editing with improved accuracy, this recorder is equipped with a horizontal phase control which enables the H phase of the recorder to be precisely aligned with the H phase of the player. For this purpose, proceed as follows:

1. Set the H-PHASE control of the player to its center click position.
2. Engage the recorder in the Insert Edit mode.
3. While starting and stopping insert edits repeatedly, turn the H-PHASE control of the recorder until the LED indicator above the H-PHASE control lights. This can also be confirmed on the monitor screen (internal sync monitor) on which the horizontal sync signal will no longer be visible when the horizontal phases of both the recorder and player have been perfectly aligned.

H-PHASE indicator and H-PHASE control

The LED indicator above the H-PHASE control doubles as the frame servo indicator and as the horizontal phase indicator. In conjunction with the setting of the FRAME SERVO switch on the rear panel, this LED indicator functions in the following manner:

1. With the FRAME SERVO switch set to ON
   The indicator will light if the input signal to be edited has the same horizontal phase as the playback video signal. In practice, before starting editing, adjust the H-PHASE control so that the indicator lights.
   Notes:
   - If there is no input signal, the H-PHASE control does not function and the indicator extinguishes.
   - During recording or editing, the H-PHASE control does not function with the indicator lighted.
2. With the FRAME SERVO switch set to OFF
   The indicator remains off and the H-PHASE control does not function.

Synchronization of the editing servo

The servo circuit of the recorder is locked to the input video signal or the external sync signal regardless of the editing mode selected.

Therefore, when the recorder's SYNC select switch is set to the VIDEO position, its servo circuit is affected by the playback conditions of the player. For instance, if the player is in the Still or Search mode, the playback picture from the recorder (while in the Play mode) may become unsynchronized.

In order to obtain a stable playback picture from the recorder, it is recommended that the player be in the Stop mode or in the Play mode (if the tape on the player contains normal recordings), or use an external sync signal with the SYNC select switch set to the EXT position.

The reference sync signal for the servo systems during recording and playback differs as illustrated on page 14, depending on the settings of the SYNC and INPUT select switches and the conditions of the signals applied to the input terminals.

FRAME SERVO switch

During tape-to-tape dubbing using tapes with an inferior playback picture S/N ratio, duplicates of more than three generations, tapes recorded using random-interlaced ITV cameras or edited using other manufacturers' editors, picture distortion may occur at edit points. This is due to malfunctioning of the framing servo. To avoid this, set the FRAME SERVO switch to the OFF position.

Monitor synchronization in the Still and Search modes

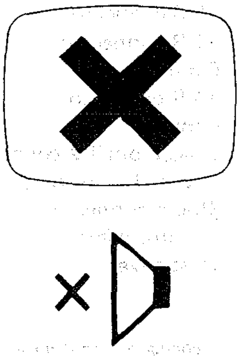
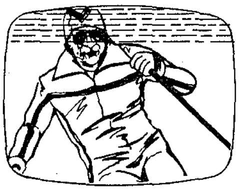
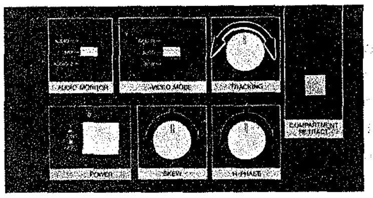
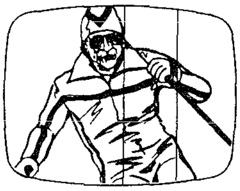
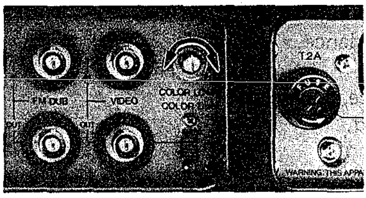
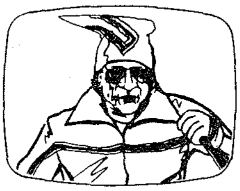
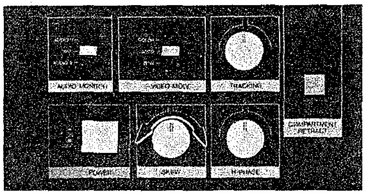
The playback video signal incorporates a vertical sync pulse (V-pulse) so that the monitor remains synchronized even in the Still and Search modes. Because of this pulse, if other manufacturers' monitors are used, horizontal sync may be partially lost (the top of the picture may be distorted). If this happens, unplug connector P129 (STILL PULSE) of the head amplifier circuit board. (For details consult a JVC Service Dealer.)

- When the STILL PULSE connector is removed, horizontal sync might become unstable, depending on the position of noise bars.

We recommend use of the external sync mode

The external sync mode (EXT SYNC) will stabilize the entire servo system, thereby producing stabler playback pictures. We recommend use of the external sync mode whenever possible.

IN CASE OF DIFFICULTY

Symptoms	Check points	Remarks
No picture, No sound 	• Check if the VTR/TV switch of the TV monitor is set to the VTR position. If not, set it to VTR.	• For more information refer to the instruction manual of the TV monitor.
Noise bars or smeared picture 	• Check if the TRACKING control has moved off centre. • Turn the TRACKING control slowly until the picture centre.  AUDIO MONITOR VIDEO MODE TRACKING COMPARTMENT RETRACT POWER SKEW H-PHASE	• After playing back the tape, return this control to its centre click-stop position.
Monochrome picture, wrong tint or colour stripes 	• Turn the COLOR LOCK control slowly until the correct colours are obtained.  FM DUB VIDEO COLOR LOCK T2A FUSE WARNING: THIS APP	• Adjustment of colour, tint, brightness and contrast cannot be done with this control. • After playing back the tape, return this control to its centre click-stop position.
Skew – upper portion of the picture drifts horizontally. 	• Use the SKEW control to correct this phenomenon. • First turn the V-hold control of the television so that the frame line (corresponding to the blanking period) can be seen and turn the SKEW control slowly in either direction until slight bending of this frame line is corrected.  AUDIO MONITOR VIDEO MODE TRACKING COMPARTMENT RETRACT POWER SKEW H-PHASE	• Do not turn the SKEW control during recording. • After playing back the tape, return this control to its centre click-stop position.

SPECIFICATIONS

GENERAL
Power requirement : AC 110/127/220/240 V∿, ±10 % 50/60 Hz, 120 W (max. 130 W with RM-88U Editing Control Unit)
Dimensions : 56.4(W) x 22.1(H) x 47.1(D) cm
Weight : 30.6 kg
Operating temperature : 5°C to 40°C
Operating position : Horizontal only
Tape speed : 9.53 cm/sec
Recording time : Max. 60 min. with JVC KCA-60
Fast forward/Rewind time : Within 4 min. 30 sec. for 60 min. tape
Wow & flutter : Less than 0.15 % RMS

VIDEO
Recording system : Rotary two-head, helical scanning system
  Luminance : FM recording
  Colour signal : Converted subcarrier direct recording
Video signal system : PAL-type colour signal 625 lines (CCIR standard)
Input Line/TV : 0.5 – 2.0 Vp-p, 75 ohms
  FM dubbing : 0.5 Vp-p, 75 ohms
Output Line/TV : 1.0 Vp-p, 75 ohms
  FM dubbing : 0.5 Vp-p, 75 ohms
Signal-to-Noise ratio : More than 46 dB (colour)
  More than 48 dB (B/W)
  (Rohde & Schwarz noise meter)
Horizontal resolution : Monochrome 330 lines
  Colour 250 lines
SC input : 2.0 Vp-p, 75 ohms
Sync input : 0.5 to 4.0 Vp-p, 75 ohms
Input select : TV/LINE/FM DUB
Video mode select : COLOR/AUTO/BW
Sync select : EXT/VIDEO (INT)

AUDIO
Input Line : -20/0 dBs, 10 k ohms, balanced
  Mic. : -70 dBm, 600 ohms, unbalanced
  TV : -20 dBs, 10 k ohms, unbalanced
Output Line : -20/0 dBs, low impedance, balanced
  Monitor : 0 dBs, low impedance, balanced
  Headphone : -28 dBs, 8 ohms load, unbalanced
  TV : 0 dBs, low impedance, unbalanced
Signal-to-Noise ratio : More than 48 dB (at 3 % distortion level)
Frequency response : 50 to 15000 Hz
Input select : TV/LINE/MIC
Monitor output select : CH-1/MIX/CH-2

CONNECTORS
RF OUT : AERIAL connector
Video input/output : BNC connector
FM dubbing input/output : BNC connector
Sync/SC input : BNC connector
Audio Line input/output : XLR connector
  Mic. : 6 mm jack
  Monitor out : XLR connector
  Headphone : 6 mm jack
TV input/output : EIAJ 8-pin TV connector
AC in : 3-wire IEC socket
Remote control : 45-pin connector

ACCESSORIES
: Monitor cable
  Dust cover

Design and specifications subject to change without notice.

CR-6650E
MAGNETOSCOPE COULEUR A CASSETTE

SOMMAIRE

AVERTISSEMENT:

POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A L'HUMIDITE OU A LA PLUIE.

SYSTEME D'ALIMENTATION

Branchement au réseau d'alimentation

La tension de fonctionnement de cet appareil est réglée en usine sur 240 V∿.

Avant de brancher l'appareil sur la prise secteur, s'assurer que le réglage du sélecteur de tension situé sur le panneau arrière corresponde bien à la tension secteur du réseau d'alimentation local.

Adaptation à la tension secteur locale

Cet appareil fonctionne aussi bien sur 110, 127 ou 220 volts que sur 240 volts, courant alternatif.

Si la tension préréglée est différente de celle de la tension secteur locale, régler le sélecteur de tension en introduisant un tournevis dans la fente du sélecteur de tension et en tournant jusqu'à ce que la tension convenable soit indiquée.

ATTENTION

Pour éviter tout risque d'électrocution, ne pas ouvrir le coffret. Aucune pièce interne n'est à régler par l'utilisateur. Se référer à un agent qualifié en cas de problème.

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PRECAUTIONS A OBSERVER

Maniement et stockage

- Eviter d'utiliser le CR-6650E dans les conditions suivantes:
  - dans les endroits soumis à des températures extrêmes de chaleur, de froid ou à l'humidité,
  - dans les endroits poussiéreux,
  - à proximité d'appareils générateurs de champs magnétiques puissants,
  - dans les endroits soumis à des vibrations, et
  - dans les endroits mal aérés.
- Faire attention à la condensation due à l'humidité.
  Eviter d'utiliser le CR-6650E immédiatement après avoir transporté celui-ci d'un endroit froid à un endroit chaud, ou bien immédiatement après avoir réchauffé une pièce qui était auparavant froide, car la vapeur d'eau contenue dans l'air se condense sur les têtes vidéo, le tambour et les guides de bande qui sont encore froids. Cette humidité risque d'endommager la bande et l'appareil.
- Prendre soin du CR-6650E.
  - Ne pas placer le protège-poussière (fourni) du magnétoscope sur celui-ci quand vous vous en servez.
  - Ne pas boucher les ouïes d'aération.
  - Ne pas poser d'objets lourds sur le magnétoscope.
  - Ne pas poser d'objets risquant de se renverser et d'endommager le haut du couvercle du magnétoscope.
  - Utiliser l'appareil uniquement en position horizontale.

- En cas de transport.
  - Eviter d'infliger des chocs violents en cours de transport ou d'emballage.
  - Avant l'emballage, ne pas oublier de retirer la cassette.

Cassettes vidéo

- Utiliser des cassettes vidéo aux normes U3/4" de série KCA. Cependant, les cassettes plus petites KCS-20 peuvent être aussi utilisées avec ce magnétoscope. Pour mettre en place une cassette KCS-20 dans ce magnétoscope, il est nécessaire d'aligner la fente guide de la cassette avec l'arête guide située sur le porte-cassette.
- Avant d'effectuer un enregistrement ou un montage, prendre soin à ce que le capuchon rouge soit bien en place sur l'autre face de la cassette. Sans ce capuchon, montage et enregistrement sont impossibles. Enlever ce capuchon quand vous voulez protéger un enregistrement contre tout effacement accidentel.

CARACTERISTIQUES GENERALES

Moteurs de tambour de têtes et de cabestan à entraînement direct

Le tambour de têtes et le cabestan sont asservis par un moteur CC à entraînement direct et sans balai pour vous donner une stabilité excellente à long terme.

Châssis en aluminium moulé, garantie d'une fiabilité durable

Une grande fiabilité et un fonctionnement à longue échéance pour le mécanisme de commande de la bande sont rendus possibles grâce au châssis en aluminium moulé, au mécanisme de chargement de bande à deux moteurs et au mécanisme électrique d'éjection de la cassette.

Système d'asservissement des bobines et moteurs des bobines indépendants

La stabilité du transport de bande est encore améliorée par des moteurs indépendants au niveau alimentation qui entraînent les bobines d'enroulement et par le servomécanisme des bobines qui conserve une tension constante non seulement en enregistrement et en lecture mais aussi en avance rapide et en réembobinage, de sorte qu'il n'y a jamais de surtension sur la bande, à petite ou à grande vitesse.

Doublage FM-FM pour des copies encore meilleures

Dans le système de doublage FM-FM les signaux sont transférés sous forme de signaux FM, ce qui amoindrit la dégradation de la qualité de l'image et fait du CR-6650E le magnétoscope maître idéal pour des productions et des copies dans le domaine du software.

Connecteurs de type professionnel

Des connecteurs de type BNC sont utilisés pour l'entrée et la sortie des signaux vidéo et des connecteurs à 3 broches XLR pour les signaux d'entrée et de sortie audio.

Commande de phase horizontale

Pour que le CR-6650E soit parfaitement synchronisé avec la phase horizontale du magnétoscope lecteur pour assurer un montage extrêmement précis.

Une commande et un compteur de niveau vidéo

Le niveau du signal vidéo qui est enregistré sur la bande est indiqué sur un compteur pour que vous puissiez mettre au maximum le courant de l'enregistrement vidéo.

Compteur d'alignement

Pour que vous puissiez régler l'alignement très précisément, le CR-6650E est muni d'un compteur d'alignement indépendant.

Commande du cadran pour vitesses variables

La vitesse de la lecture peut être continuellement variée de 0 (pause) à 5 fois la vitesse ordinaire, en sens avant et arrière à l'aide du cadran rotatif du contrôleur de montage.

Commande logique assistée par micro-ordinateur

Le système de commande logique à micro-ordinateur permet de changer directement de mode sans passer par la touche d'arrêt. Ce dispositif rend possible la télécommande totale de toutes les fonctions.

Asservissement du cabestan et fonction de verrouillage externe

L'asservissement du cabestan permet à la lecture d'être verrouillée aux signaux de synchronisation externes. La prise d'entrée de la sous-porteuse externe accepte le raccordement d'un correcteur de base de temps.

Préenroulement automatique

Quand la touche PAUSE est enfoncée en enregistrement, la bande est automatiquement préenroulée et s'arrête environ 2 secondes après.

Compeur de bande électronique en temps réel

Le compteur de bande est commandé électroniquement; il a des tubes fluorescents pour vous permettre de le lire clairement et facilement. La cadran indique le temps écoulé jusqu'à 59 minutes 59 secondes, ce qui rend le répertoriage aisé.

Mécanisme de recherche automatique

Ceci permet le repérage automatique de n'importe quel segment de la bande à l'aide du compteur de bande.

Mécanisme de répétition automatique

Quand le mode de répétition automatique est sélectionné, la bande est automatiquement réenroulée jusqu'à son début et la lecture recommence alors.

Commande et compteurs de niveau audio

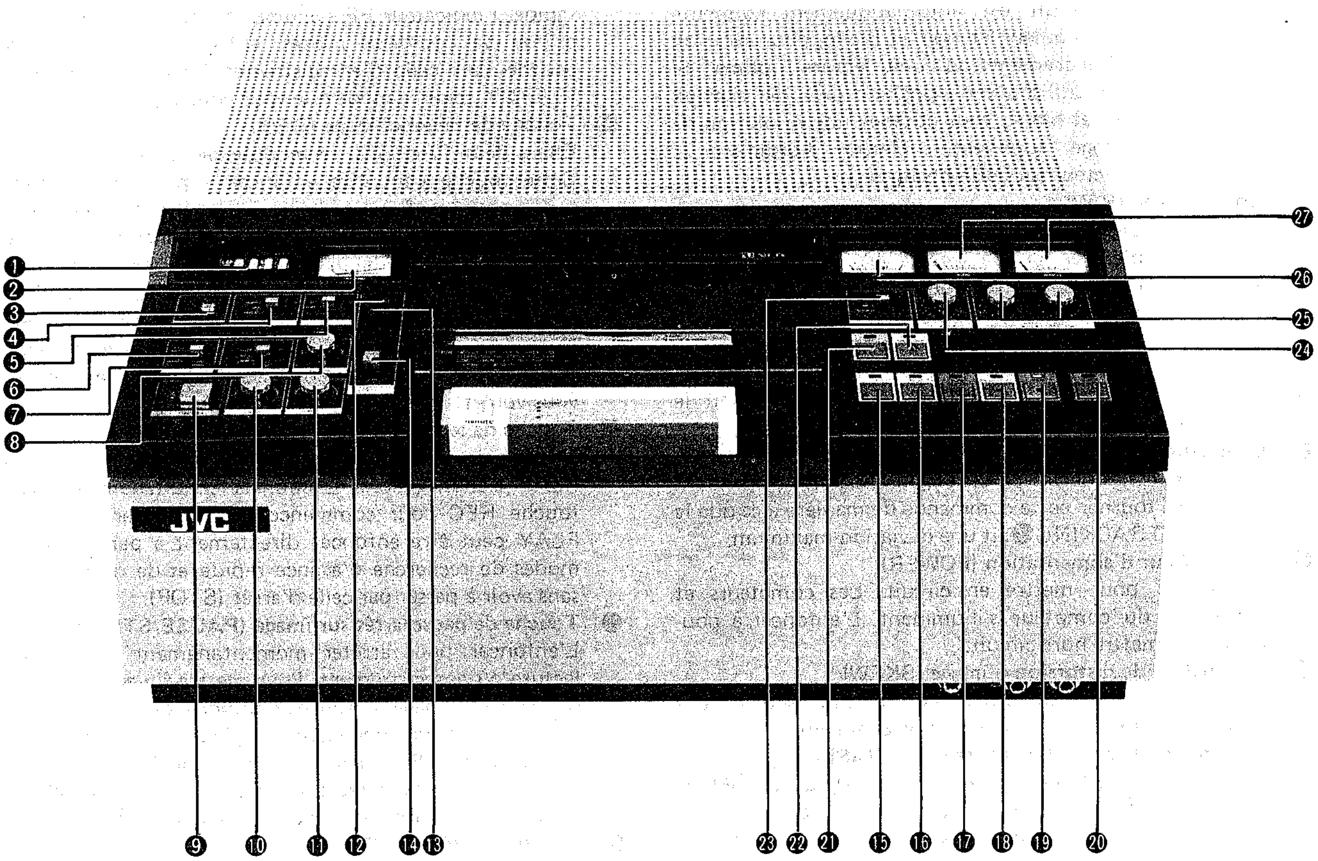
Un circuit de limiteur audio est prévu sur chaque canal pour éviter des enregistrements audio de niveau trop élevé. En mode de réglage manuel du niveau d'enregistrement le niveau de l'enregistrement sonore peut être ajusté en se référant aux compteurs.

Mode attente incorporé pour une plus grande facilité de fonctionnement

Quand vous enfoncez la touche d'arrêt (STOP) dans n'importe quel mode, le mode attente est alors engagé, et puisque la bande reste enroulée autour du tambour de têtes en attente, le mode enregistrement ou lecture peut alors immédiatement commencer.

COMMANDES ET CONNECTEURS

PANNEAU DE COMMANDE



❶ **Compteur de bande**
Ce compteur de bande en temps réel à 4 chiffres indique le temps de la bande qui défile jusqu'à 59 minutes 59 secondes.

❷ **Commande d'alignement (TRACKING)**
Quand vous réglez l'alignement, tourner la commande TRACKING ❽ de manière à ce que l'aiguille de ce compteur ait une déviation maximum.

❸ **Touche de remise à zéro du compteur (COUNTER RESET)**
Pour remettre le compteur à "00:00".

❹ **Sélecteur de mode automatique (AUTO MODE)**
Ce sélecteur choisit les fonctionnements automatiques spécialement liés au réembobinage.
Recherche (SEARCH): La bande s'arrête automatiquement quand elle est réembobinée et que le compteur indique "00:00", l'appareil entre alors dans le mode arrêt.
Arrêt (OFF): Aucun fonctionnement automatique.
Répétition (REPEAT): Quand la bande est réenroulée jusqu'à son début, elle s'arrête, puis elle est rechargée automatiquement pour que la lecture recommence.

❺ **Sélecteur de synchronisation (SYNC)**
Pour sélectionner entre les différents signaux de synchronisation de référence pour l'asservissement en lecture et en enregistrement. Pour plus de détails voir "SIGNAUX DE SYNCHRONISATION DE REFERENCE POUR L'ENREGISTREMENT ET LA LECTURE" page 32.

❻ **Sélecteur de contrôle audio (AUDIO MONITOR)**
Ce sélecteur sélectionne la sortie audio disponible sur la prise TV à 8 broches, le jack de casque d'écoute ou la prise de contrôle audio (AUDIO MONITOR).
AUDIO-1: Pour écouter la canal-1.
MIX: Pour écouter le son mélangé des canaux audio -1 et -2.
AUDIO-2: Pour écouter le canal-2

❼ **Sélecteur de mode vidéo (VIDEO MODE)**
Choisir l'une des trois positions suivant le signal d'entrée en enregistrement ou le signal de sortie en lecture.

Couleur: (COLOR) Le mettre sur cette position quand le signal vidéo d'entrée ou de lecture est un signal couleur.

Automatique (AUTO):
Le circuit est automatiquement commuté entre couleur et noir et blanc, pour avoir un enregistrement ou une lecture optima. Si vous utilisez cette position avec des signaux noir et blanc, vous obtenez une résolution de l'image supérieure. Mettre d'ordinaire le sélecteur sur cette position.

Noir et blanc (B/W):
Le mettre sur cette position quand le signal d'entrée ou de lecture est un signal monochrome. Une résolution d'image supérieure est alors obtenue.

- Une diode LED vous empêche d'enregistrer par erreur des signaux couleur en noir et blanc. Cet indicateur s'allume quand le sélecteur est sur B/W.

❽ **Commande d'alignement (TRACKING)**
Pour enlever les barres parasites qui apparaissent pendant la lecture, tourner cette commande de manière à ce que le compteur TRACKING❷ait une déviation maximum.

❾ **Interrupteur d'alimentation (POWER)**
L'enfoncer pour mettre en circuit. Les compteurs et l'affichage du compteur s'illuminent. L'enfoncer à nouveau pour mettre hors circuit.

❿ **Commande de distorsion d'image (SKEW)**
Tourner cette commande pour corriger l'image de lecture si sa partie supérieure est aplatie horizontalement.

⓫ **Commande de phase horizontale (H-PHASE)**
L'utiliser pour aligner la phase horizontale du CR-6650E sur celle du magnétoscope lecteur pour avoir des montages plus précis. Quand les deux magnétoscopes entrent dans la même phase, l'indicateur à diode LED s'allume.

⓬ **Indicateur de danger (WARNING)**
Cette diode LED s'allume dans les cas suivants, et toute fonction s'arrête.

1) Quand le mécanisme du transport de bande ne fonctionne pas correctement et qu'aucune bande n'est enroulée ou mise en circuit.
2) Quand la lampe de détection de la fin de bande n'est pas branchée.
3) Quand le moteur du tambour s'arrête et
4) Quand le senseur de condensation se met en marche.
   - Quand cette diode LED s'allume mettre immédiatement l'appareil hors circuit.

⓭ **Indicateur du verrouillage du système d'asservissement (SERVO LOCK)**
S'allume quand le système d'asservissement est verrouillé pour un fonctionnement normal.

⓮ **Levier d'abaissement du compartiment cassette (COMPARTMENT RETRACT)**
Le pousser en arrière pour abaisser le compartiment cassette vide. Quand le magnétoscope n'est pas en marche, le compartiment cassette doit être dans sa position abaissée.

- N'utiliser ce levier que pour abaisser le compartiment cassette vidéo, non pas pour insérer une cassette.

⓯ **Touche d'avance rapide (FF)**
Elle a deux fonctions: l'avance rapide et la recherche avant. Cette touche peut être enfoncée à partir de n'importe quel mode sauf celui d'enregistrement. Quand elle est enfoncée en mode lecture, la recherche avant est mise en route et la bande défile à environ 15 fois la vitesse ordinaire. Que ce soit en recherche avant ou en avance rapide, l'indicateur FF s'allume toujours. Pour mettre fin à l'un de ces deux modes, enfoncer n'importe quelle touche sauf celle d'enregistrement (REC) ou d'éjection (EJECT), selon le mode que vous voulez.

⓰ **Touche de réembobinage (REW)**
Elle a deux fonctions: réembobinage et recherche arrière. Cette touche peut être enfoncée à partir de n'importe quel mode sauf celui d'enregistrement. Quand elle est enfoncée dans le mode lecture, la recherche arrière est mise en route et la bande défile environ à 15 fois la vitesse normale. Que ce soit en recherche arrière ou en réembobinage l'indicateur REW s'allume toujours. Pour mettre fin à l'un de ces deux modes, enfoncer n'importe quelle touche sauf REC ou EJECT, suivant le mode que vous voulez.

⓱ **Touche de lecture (PLAY)**
L'enfoncer pour commencer la lecture. L'indicateur PLAY s'allume alors. L'enfoncer simultanément avec la touche REC pour commencer à enregistrer. La touche PLAY peut être enfoncée directement à partir des deux modes de recherche d'avance rapide et de réembobinage sans avoir à passer par celle d'arrêt (STOP).

⓲ **Touche de pause/arrêt sur image (PAUSE/STILL)**
L'enfoncer pour arrêter momentanément la bande en lecture ou enregistrement. Pour mettre fin au mode pause ou arrêt sur image, enfoncer n'importe quelle touche sauf EJECT, suivant le mode que vous voulez. Si vous enfoncez la touche STOP à partir d'un mode autre que celui d'attente, les indicateurs PAUSE/STILL et STOP vont s'allumer et le magnétoscope entrera dans le mode attente.

⓳ **Touche d'arrêt (STOP)**
Quand une cassette est insérée, la bande est partiellement chargée et arrêtée (cette situation s'appelle le mode arrêt). L'indicateur STOP reste allumé.
Enfoncer la touche STOP une fois pour engager le mode attente à partir de n'importe quel autre mode. Pour entrer dans le mode arrêt, enfoncer la touche STOP encore une fois.

⓴ **Touche d'éjection (EJECT)**
L'enfoncer pour éjecter une cassette. L'éjection de la cassette ne peut se faire qu'à partir du mode arrêt ou attente. Quand vous enfoncez la touche EJECT après avoir enfoncé celle de STOP, l'indicateur à diode LED situé au-dessus de la touche EJECT se met à clignoter. Une fois que le déchargement de la bande est fini, la cassette est automatiquement éjectée.

㉑ **Touche d'enregistrement (REC)**
L'enfoncer simultanément avec celle de PLAY pour commencer à enregistrer les signaux audio et vidéo. Quand vous enfoncez la touche REC en lecture, l'écran du moniteur passe de l'image de lecture à celle du mode électronique-électronique E-E, ce qui vous permet de contrôler les signaux qui parviennent aux bornes d'entrée.

㉒ **Touche de doublage son du canal-1 (AUDIO-1 DUB)**
La piste sonore du canal-1 peut être doublée. Enfoncer cette touche simultanément avec celle de PLAY.

㉓ **Sélecteur d'entrée (INPUT)**

TV:	Le mettre sur cette position pour enregistrer des signaux via la prise TV à 8 broches. En ce cas, le signal audio est enregistré sur la piste du canal-2.
Ligne: (LINE)	Le mettre sur cette position pour enregistrer des signaux d'entrée via les prises VIDEO IN et AUDIO IN (CH-1, CH-2) ou via les prises micro MIC (CH-1, CH-2).
Doublage (FM FM DUB):	Le mettre sur cette position pour un doublage FM-FM. • Dans cette position, les signaux audio mis en entrée via les prises AUDIO IN ou MIC peuvent être enregistrés.

- Quand le CR-6650E est utilisé comme lecteur pour un doublage FM-FM, ce sélecteur doit être sur LINE.

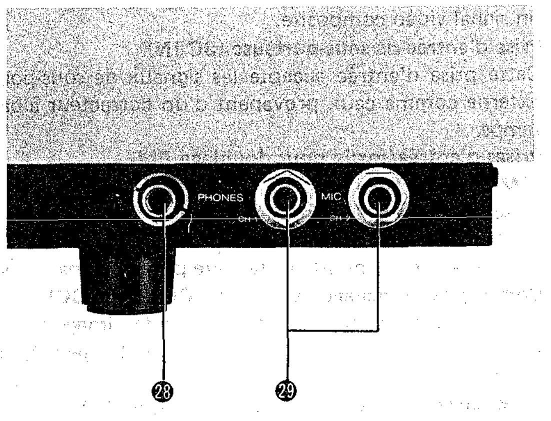
㉔ **Commande de niveau d'enregistrement vidéo (VIDEO REC LEVEL)/commutateur de contrôle automatique de gain (AGC)**
Quand cette commande est sur sa position "entrée", le circuit de contrôle automatique de gain AGC est activé. Quand la commande est "sortie", le réglage manuel du niveau vidéo est possible si vous tournez cette commande en vous référant au compteur de niveau vidéo VIDEO ㉖.

㉕ **Commandes de niveau d'enregistrement audio (AUDIO REC LEVEL)/commutateurs du limiteur (LIMITER)**
Pour un réglage manuel de l'enregistrement, tirer les boutons des commandes vers soi et les tourner pour avoir un enregistrement optimal. Si vous les enfoncez, le limiteur audio est mis en circuit (ON), ce qui empêche la présence de sons distordus même si les signaux de crête d'entrée dépassent momentanément le niveau de référence. Dans un tel cas, le réglage manuel est impossible.

㉖ **Compteur vidéo (VIDEO)**
Ce compteur indique le niveau de l'enregistrement vidéo. Pour un réglage manuel tourner la commande VIDEO REC LEVEL de manière à ce que l'aiguille du compteur se trouve dans la zone verte.

㉗ **Compteurs de niveau audio (AUDIO-1, AUDIO-2)**
Ces compteurs indiquent le niveau audio en lecture et en enregistrement. Pour un réglage manuel, régler le niveau de crête maximum sur + 3 dB.

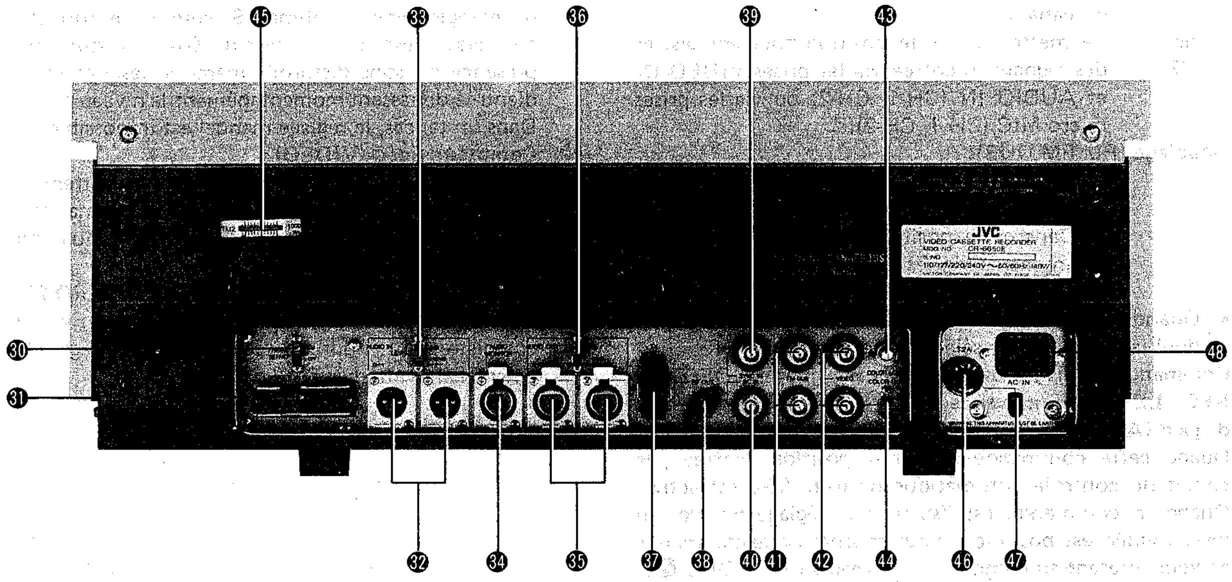
PANNEAU FRONTAL



㉘ **Jack de casque d'écoute (PHONES)**
Raccorder un casque d'écoute ayant une impédance de 8 ohms. Vous pouvez entendre le canal audio sélectionné par le sélecteur AUDIO MONITOR ⑥.

㉙ **Prises de microphones (MIC CH-1, CH-2)**
Raccorder des microphones de 600 ohms d'impédance et de –70 dBm de sensibilité. Lorsque les micros sont raccordés, l'entrée de ligne est mise automatiquement hors circuit.

PANNEAU ARRIERE



㉚ **Commutateur d'asservissement image (FRAME SERVO)**
Placer normalement ce commutateur sur ON. Cependant, lorsque les bandes utilisées contiennent des signaux vidéo à entrelacement intermittent ou à faible rapport signal/bruit, le placer sur OFF.

㉛ **Borne de télécommande (REMOTE)**
Raccorder un boîtier de télécommande JVC à cette borne.

㉜ **Prises d'entrée de ligne audio (AUDIO IN, CH-1, CH-2)**
Connecteurs d'entrée de ligne audio pour les canaux audio-1 et -2.

㉝ **Sélecteur de niveau d'entrée audio (AUDIO IN LEVEL)**
Choisir 0 dB ou –20 dB suivant le niveau du signal d'entrée audio. Le niveau est réglé simultanément sur chacun des deux canaux.

㉞ **Prises de sortie du contrôle audio (AUDIO MONITOR)**
Le signal audio sélectionné par le commutateur AUDIO MONITOR est disponible à cette prise.

㉟ **Prises de sortie de ligne audio (AUDIO OUT CH-1, CH-2)**
Prises de sortie audio des canaux-1 et -2.

㊱ **Sélecteur de sortie du niveau audio (AUDIO OUT LEVEL)**
Choisir 0 dB ou –20 dB suivant le niveau du signal de sortie audio. Le niveau est réglé simultanément sur chacun des deux canaux.

㊲ **Prise de moniteur télévision (TV)**
Cette prise d'entrée/sortie à 8 broches est destinée au raccordement d'un moniteur de télévision. Le signal audio choisi par le sélecteur AUDIO MONITOR est disponible à la prise de sortie audio.

㊳ **Prise de sortie HF (RF OUT)**
Le signal de sortie HF est disponible à cette prise. Raccorder un téléviseur ordinaire pour visionner la vidéocassette.

㊴ **Prise d'entrée du signal de synchronisation externe (SYNC IN)**
Cette prise d'entrée accepte un signal de référence de synchronisation externe quand le magnétoscope est en mode synchronisation externe. Le signal de synchronisation externe peut être un signal synchro composite ou un signal vidéo composite.

㊵ **Prise d'entrée de sous-porteuse (SC IN)**
Cette prise d'entrée accepte les signaux de sous-porteuse externe comme ceux provenant d'un correcteur à base de temps.

㊶ **Prises d'entrée/sortie pour doublage FM (FM DUB IN/OUT)**
Prises d'entrée (IN)/sortie (OUT) pour doublage FM.

㊷ **Prises d'entrée/sortie de ligne vidéo (VIDEO IN/OUT)**
Prises d'entrée et de sortie de ligne pour le signal vidéo.

㊸ **Commande de réglage de couleur (COLOR LOCK)**
La tourner pour corriger les couleurs de l'image de lecture si elle perd ses couleurs ou si celles-ci changent brusquement.

㊹ **Commutateur de copie couleur (COLOR DUB)**
Quand vous effectuez une copie d'une bande couleur sur un deuxième magnétoscope, mettre le commutateur sur ON. Ceci améliorera la qualité couleur de la bande qui reçoit la copie.

㊺ **Compteur de temps**
Il indique le temps global de fonctionnement. Après 1000 heures, la ligne rouge se déplace vers le côté droit de l'échelle.

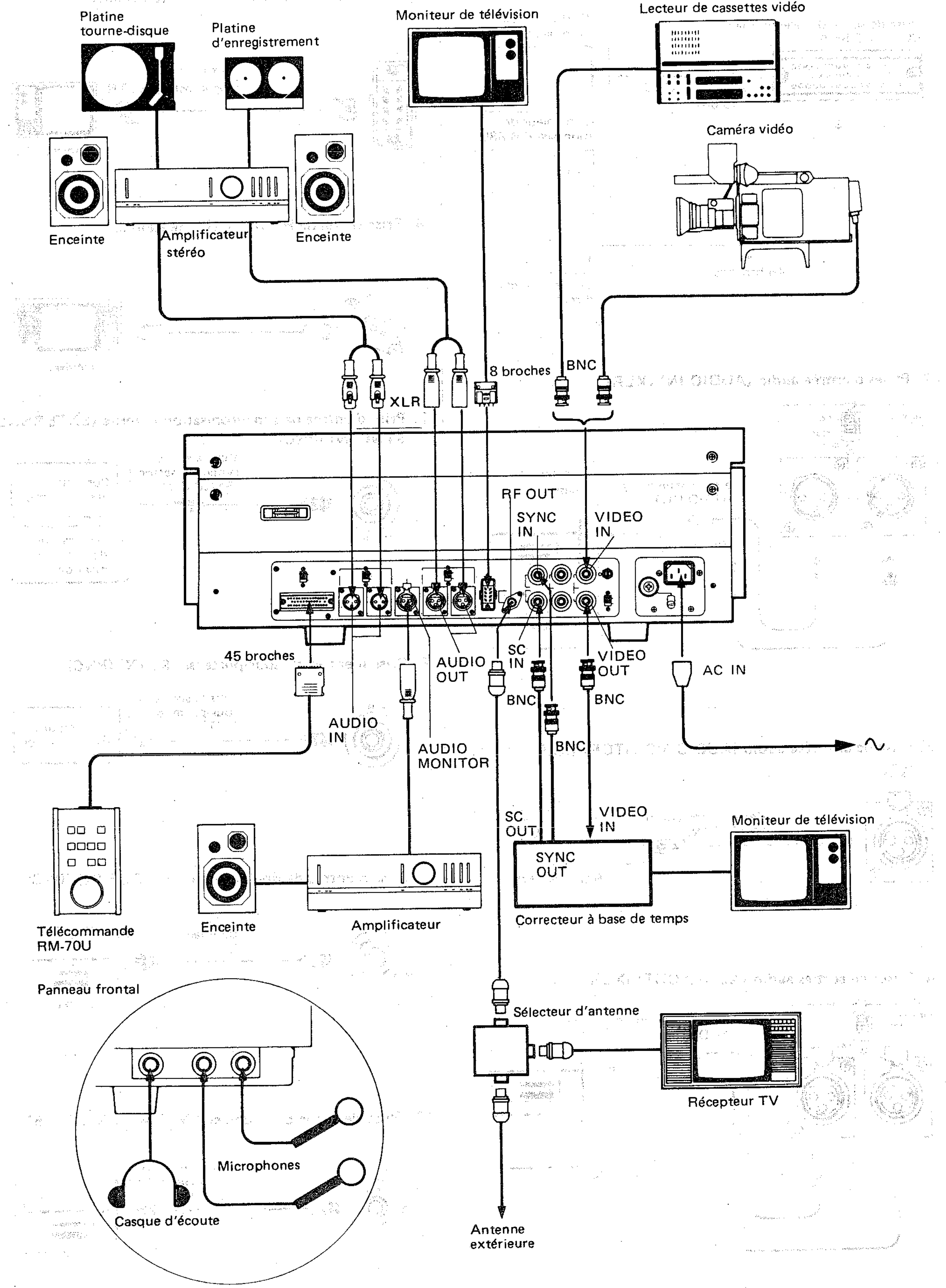
㊻ **Porte-fusible**

㊼ **Sélecteur de tension**
Le régler sur votre tension de réseau d'alimentation CA 110/127/220/240 V∿.

㊽ **Prise d'entrée secteur (AC IN)**

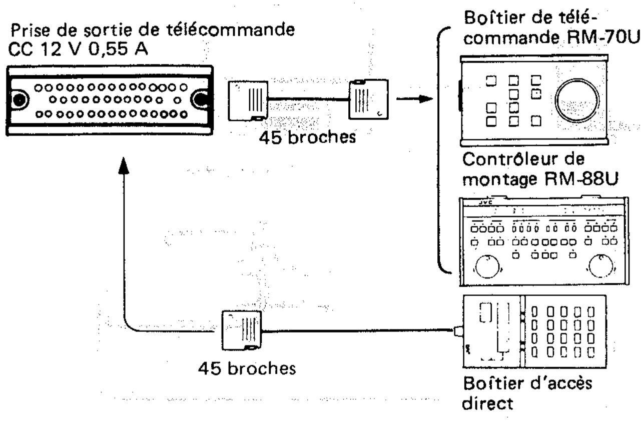
RACCORDEMENTS

RACCORDEMENT D'EQUIPEMENT AUDIO ET VIDEO

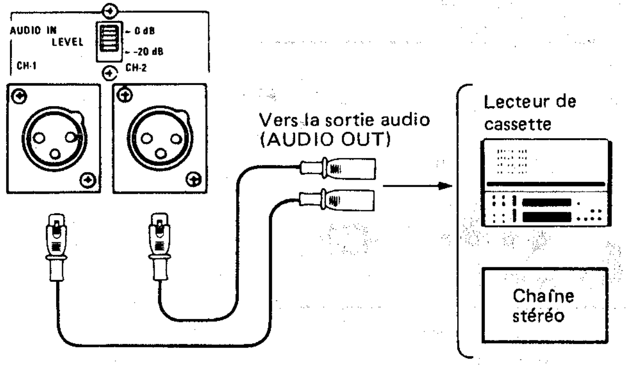


Platine tourne-disque
Platine d'enregistrement
Moniteur de télévision
Lecteur de cassettes vidéo
Caméra vidéo
Enceinte
Amplificateur stéréo
Enceinte
8 broches
BNC
XLR
RF OUT
SYNC IN
VIDEO IN
45 broches
AUDIO OUT
SC IN
VIDEO OUT
AC IN
BNC
BNC
BNC
AUDIO IN
AUDIO MONITOR
SC OUT
VIDEO IN
SYNC OUT
Moniteur de télévision
Correcteur à base de temps
Télécommande RM-70U
Enceinte
Amplificateur
Panneau frontal
Microphones
Casque d'écoute
Sélecteur d'antenne
Récepteur TV
Antenne extérieure

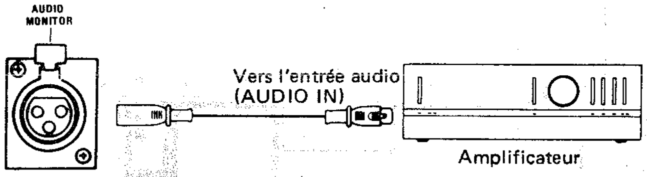
1. Prise de télécommande (REMOTE) (45 broches)


Prise de sortie de télécommande
CC 12 V 0,55 A
45 broches
Boîtier de télécommande RM-70U
Contrôleur de montage RM-88U
45 broches
Boîtier d'accès direct

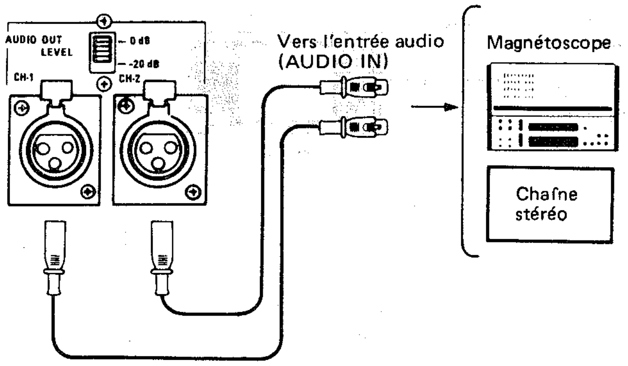
2. Prises d'entrée audio (AUDIO IN) (XLR)


AUDIO IN LEVEL
0 dB
-20 dB
CH-1
CH-2
Vers la sortie audio (AUDIO OUT)
Lecteur de cassette
Chaîne stéréo

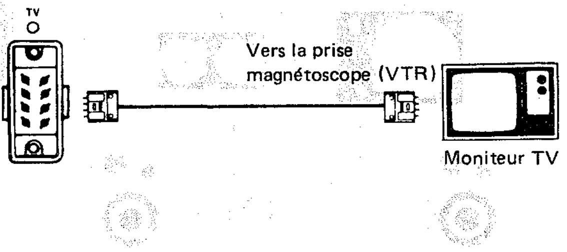
3. Prise de contrôle audio (AUDIO MONITOR) (XLR)


AUDIO MONITOR
Vers l'entrée audio (AUDIO IN)
Amplificateur

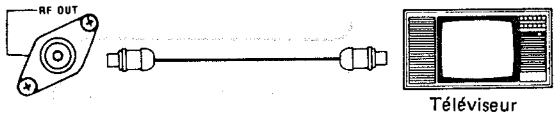
4. Prises de sorties audio (AUDIO OUT) (XLR)


AUDIO OUT LEVEL
0 dB
-20 dB
CH-1
CH-2
Vers l'entrée audio (AUDIO IN)
Magnétoscope
Chaîne stéréo

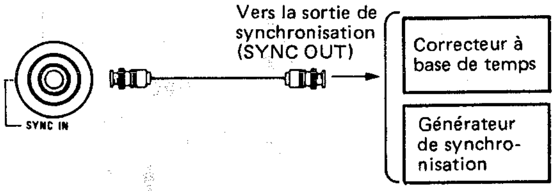
5. Prise de moniteur télévision TV (8 broches)


TV
Vers la prise magnétoscope (VTR)
Moniteur TV

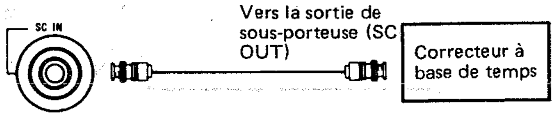
6. Prise de sortie HF (RF OUT) (antenne)


RF OUT
Téléviseur

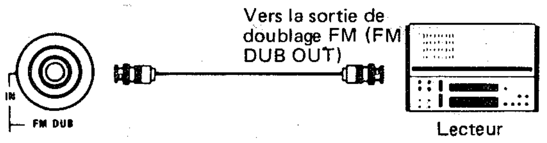
7. Prise d'entrée de synchronisation externe (EXTERNAL SYNC IN) (BNC)


Vers la sortie de synchronisation (SYNC OUT)
Correcteur à base de temps
Générateur de synchronisation
SYNC IN

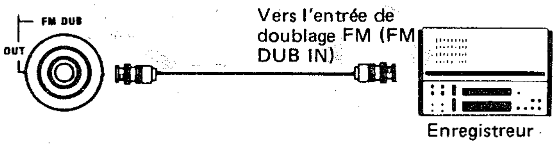
8. Prise d'entrée de sous-porteuse (SC IN) (BNC)


SC IN
Vers la sortie de sous-porteuse (SC OUT)
Correcteur à base de temps

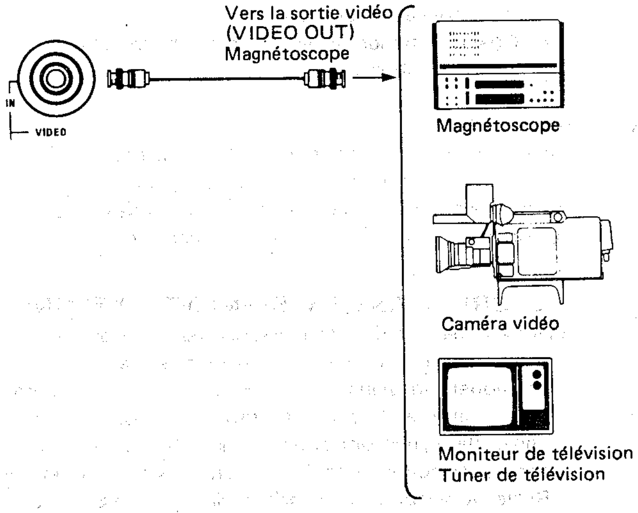
9. Prise d'entrée de doublage FM (FM DUB IN) (BNC)


Vers la sortie de doublage FM (FM DUB OUT)
IN
FM DUB
Lecteur

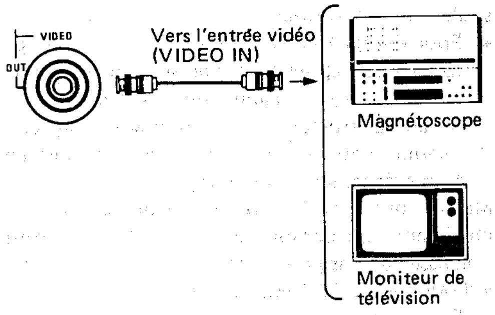
10. Prise de sortie de doublage FM (FM DUB OUT)(BNC)


FM DUB
OUT
Vers l'entrée de doublage FM (FM DUB IN)
Enregistreur

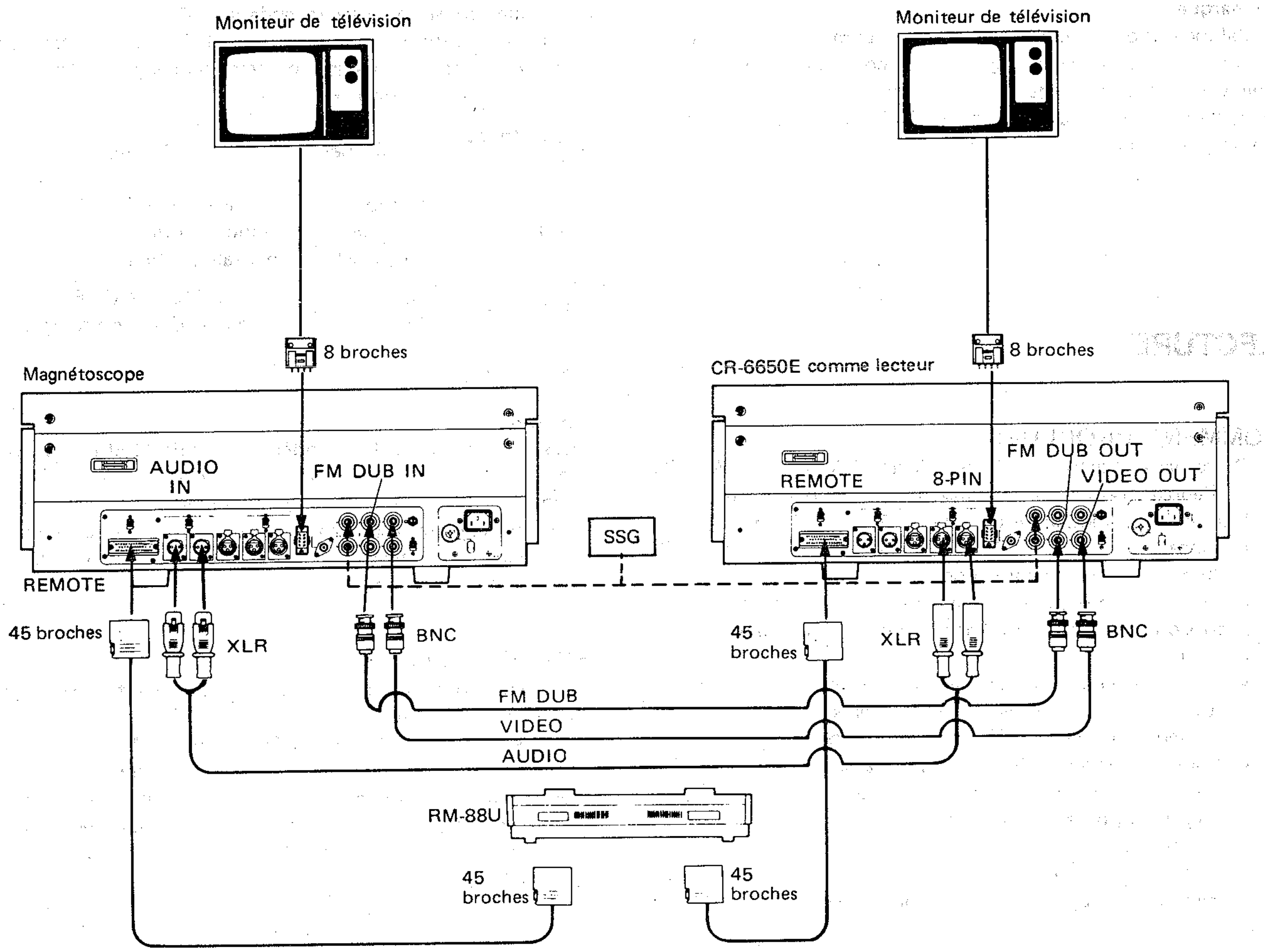
11. Prise d'entrée vidéo (VIDEO IN) (BNC)


Vers la sortie vidéo
(VIDEO OUT)
Magnétoscope
IN
VIDEO
Magnétoscope
Caméra vidéo
Moniteur de télévision
Tuner de télévision

12. Prise de sortie vidéo (VIDEO OUT) (BNC)


VIDEO
OUT
Vers l'entrée vidéo
(VIDEO IN)
Magnétoscope
Moniteur de
télévision

RACCORDEMENTS POUR UN MONTAGE


Moniteur de télévision
Moniteur de télévision
8 broches
Magnétoscope
8 broches
CR-6650E comme lecteur
AUDIO
IN
FM DUB IN
REMOTE
FM DUB OUT
VIDEO OUT
REMOTE
8-PIN
SSG
45 broches
XLR
BNC
45
broches
XLR
BNC
FM DUB
VIDEO
AUDIO
RM-88U
45
broches
45
broches

MISE EN PLACE D'UNE VIDEO CASSETTE

1. Mettre l'interrupteur d'alimentation POWER sur ON.
2. Enfoncer la touche EJECT; le compartiment-cassette se soulève automatiquement.
   - Pour enregistrer ou effectuer un montage, prendre soin à ce que le capuchon rouge soit en place à l'arrière de la cassette. Sans ce capuchon, il est impossible d'effectuer un enregistrement ou un montage. Enlever ce capuchon lorsque vous désirez protéger l'enregistrement contre tout effacement accidentel.
3. Mettre tout à fait en place la vidéocassette dans son compartiment. Le compartiment-cassette va automatiquement s'abaisser et l'appareil entre dans le mode arrêt, l'indicateur à diode LED STOP étant allumé.
   - Si le compartiment-cassette ne s'abaisse pas comme il convient, vérifier que la cassette vidéo est bien insérée. Ne jamais essayer d'abaisser le compartiment-cassette à l'aide du levier COMPARTMENT RETRACT si une cassette est en place.

MODE ATTENTE

Après que l'appareil soit entré dans le mode arrêt, enfoncer les touches PAUSE/STILL et STOP en même temps pour entrer dans le mode attente. Dans ce mode les indicateurs PAUSE/STILL et STOP sont tous deux éclairés. Pour entrer en mode attente à partir d'un autre mode, enfoncer simplement la touche STOP. Enfoncer la touche STOP une deuxième fois met le magnétoscope en mode arrêt.

Remarque:

Si l'alimentation est coupée alors que le compartiment-cassette est en train de se lever, l'éjection ne continuera pas une fois que vous refournirez de l'alimentation. Pour terminer l'éjection, enfoncer encore la touche EJECT quand l'appareil est de nouveau en circuit.

LECTURE

COMMENT PROCEDER

- D'ordinaire mettre le sélecteur VIDEO MODE sur AUTO. Si l'enregistrement est monochrome, le placer sur B/W. Dans ce cas, l'indicateur à diode LED B/W s'allume.

1. Enfoncer la touche PLAY. Son indicateur à diode LED s'allume et la lecture commence.
2. Régler les commandes d'alignement (TRACKING) et de distorsion d'image (SKEW) afin d'obtenir la meilleure image de lecture possible.
   - Si les couleurs de l'image de lecture sont anormales, les corriger en utilisant la commande de réglage de couleur (COLOR LOCK) située sur le panneau arrière.
   - Pour contrôler le signal appliqué à la prise d'entrée durant la lecture, enfoncer la touche REC. Le signal d'entrée apparaîtra sur l'écran du moniteur.
   - Ne pas enfoncer simultanément les touches REC et PLAY sinon l'appareil entrera dans le mode enregistrement et l'enregistrement de la bande sera effacé.
3. Pour garder une image fixe durant la lecture, enfoncer la touche PAUSE/STILL. Pour libérer le mode arrêt sur image enfoncer la touche PLAY.
   - Quand la bande arrive en fin de course, elle entre dans le mode réembobinage.

Remarque:

Quand vous entrez dans le mode lecture à partir du mode arrêt, il se peut que l'image roule et qu'il n'y ait pas de couleurs pendant les deux premières secondes. Pour éviter ces phénomènes, commencer la lecture à partir du mode attente.

LECTURE A ASSERVISSEMENT EXTERNE

Lorsque la lecture doit être asservie par un signal de synchronisation externe, procéder de la manière suivante:

1. Appliquer un signal de synchronisation de référence à la prise d'entrée de synchronisation (SYNC IN). Utiliser un signal de synchronisation composite ou un signal vidéo composite comme signal de synchronisation de référence.
2. Régler le sélecteur de synchronisation SYNC sur la position EXT.
3. Enfoncer la touche PLAY pour commencer la lecture.

LECTURE A L'AIDE D'UN TELEVISEUR ET D'UN CONVERTISSEUR HF

Si vous rajoutez un convertisseur HF (en option), le CR-6650E est capable de lire des cassettes vidéo sur un téléviseur. Pour plus de détails concernant le montage du convertisseur HF, veuillez consulter votre revendeur JVC.

Lorsque vous utilisez un convertisseur HF, il est nécessaire de placer le sélecteur de canaux du téléviseur sur le même canal que celui du convertisseur HF.

Convertisseur HF	Zones	Canaux
KR-250EG	Europe continentale partielle*	Canaux 43—47 UHF, standard Europe continentale partielle
KR-250EK	Grande-Bretagne	Canaux 43—47 UHF, standard Grande-Bretagne

* Sauf la France

Remarque:

- Les convertisseurs HF modèles KR-250G/250EK peuvent se régler sur les canaux 43 à 47. Introduire un tournevis dans l'ouverture n^{o} 3 du convertisseur. Tourner dans le sens des aiguilles d'une montre pour accroître la fréquence sur laquelle le convertisseur doit être réglé, et dans le sens inverse pour la diminuer.

LECTURE REPETEE

Quand vous souhaitez relire la bande, du début à la fin, procéder de la manière suivante:

1. Mettre le sélecteur AUTO MODE sur REPEAT.
2. Enfoncer la touche PLAY pour commencer la lecture. Quand la bande arrive à sa fin, elle est réenroulée jusqu'au début et la lecture est répétée automatiquement. Vous pouvez recommencer l'opération autant de fois que vous le souhaitez.

REEMBOBINAGE ET RECHERCHE ARRIERE

- Enfoncer la touche REW; le mode réembobinage démarre et l'indicateur de réembobinage à diode LED s'éclaire.
- Quand vous enfoncez la touche REW dans le mode arrêt c'est le mode réembobinage qui est déclenché. Si vous enfoncez la touche REW en mode lecture ou arrêt sur image c'est le mode recherche arrière qui est déclenché.

AVANCE RAPIDE ET RECHERCHE AVANT

- Enfoncer la touche FF. Le mode avance rapide démarre et l'indicateur FF à diode LED s'allume.
- Quand vous enfoncez la touche FF en mode arrêt, c'est le mode avance rapide qui est déclenché. Quand vous enfoncez la touche FF en mode lecture ou arrêt sur image, c'est le mode recherche avant qui est déclenché.

Remarque:

La vitesse de recherche est environ 15 fois celle de la vitesse normale. Si vous utilisez un boîtier de télécommande (en option), vous pouvez varier la vitesse de recherche de 0 à 5 fois la vitesse ordinaire en tournant le cadran de recherche de la télécommande; le mode recherche, à 15 fois la vitesse ordinaire peut être obtenu quand le cadran de recherche est tout à fait tourné dans la direction des vitesses croissantes. Il se peut que l'image roule pendant la recherche dans les deux directions si la vitesse est supérieure à 5 fois la vitesse ordinaire.

RECHERCHE PAR COMPTEUR

1. Remettre le compteur de bande à "00:00" au début d'un enregistrement, ou à partir du segment que vous voulez relire.
2. Mettre le sélecteur AUTO MODE sur SEARCH.
3. Si vous souhaitez avancer rapidement ou réembobiner la bande jusqu'à l'endroit où le compteur à été remis à zéro, enfoncer la touche FF ou REW.
4. Quand le compteur indique "00.00" la bande s'arrête automatiquement et le mode attente est engagé.

Remarque:

Il se peut que la bande défile au point "00.00" pendant 3 à 5 secondes.

REEMBOBINAGE AUTOMATIQUE

En mode lecture ou enregistrement, quand la bande a été déroulée jusqu'au bout, elle est automatiquement réenroulée jusqu'au début et entre en mode attente. La recherche par compteur et la fonction de lecture répétée sont possibles pendant le réembobinage automatique. Quand la bande a été déroulée jusqu'au bout en mode avance rapide, le mode attente est engagé automatiquement.

ENREGISTREMENT

COMMENT PROCEDER

1. D'ordinaire mettre le sélecteur VIDEO MODE sur AUTO. Pour pouvoir enregistrer des signaux en noir et blanc le mettre sur B/W. Dans ce cas l'indicateur B/W à diode LED s'éclaire.
2. Placer d'ordinaire le sélecteur SYNC sur la position VIDEO.
3. Régler le sélecteur d'entrée (INPUT) comme il faut.
   LINE: Placer le sélecteur sur cette position pour enregistrer des signaux d'entrée provenant des prises d'entrée vidéo (VIDEO IN) et audio (AUDIO IN) ou des prises micro (MIC).
   - Lorsqu'un microphone est raccordé, le signal d'entrée provenant des prises AUDIO IN est déconnecté automatiquement et le son provenant de la prise MIC est enregistré.

   TV: Placer sur cette position pour enregistrer des signaux d'entrée provenant de la prise TV à 8 broches. Dans ce cas, le signal audio est enregistré sur la piste du canal-1.
   FM DUB: Choisir cette position pour un doublage FM-FM. Pour plus de détails sur le doublage FM-FM, se reporter page 31.
4. Enfoncer simultanément les touches REC et PLAY pour entrer en mode enregistrement. En réglant la commande de niveau vidéo (VIDEO LEVEL), vous pouvez effectuer des enregistrements à un niveau optima.
5. Enfoncer la touche STOP pour mettre fin à l'enregistrement.

Remarque:

Quand le mode enregistrement est commandé à partir du mode arrêt sur image au tout début de bande, il se peut qu'il ne s'engage pas, que la bande s'enroule et que l'appareil revienne en mode arrêt sur image. Dnas un tel cas, enfoncer d'abord la touche PLAY et entrer ensuite dans le mode enregistrement, ou continuer à maintenir enfoncées pendant 3 secondes environ les deux touches REC et PLAY.

ENREGISTREMENT A VERROUILLAGE EXTERNE

Pour pouvoir enregistrer des signaux vidéo synchronisés sur un signal de synchronisation externe, procéder comme indiqué:

1. Appliquer un signal de synchronisation externe à la prise SYNC IN.
2. Mettre le sélecteur SYNC sur EXT.
3. Appliquer les signaux vidéo qui doivent être enregistrés à la prise VIDEO IN.
4. Mettre le sélecteur INPUT sur LINE.
5. Enfoncer les touches REC et PLAY en même temps pour entrer en mode enregistrement.

- Si le signal d'entrée vidéo n'est pas verrouillé sur la phase du signal de synchronisation externe, des distorsions, provoquées par les points de commutation des têtes vidéo apparaîtront sur l'image de lecture des enregistrements effectués suivant le processus indiqué ci-dessus.
- Un enregistrement à verrouillage externe est aussi possible durant une copie. Dans ce but, appliquer le même signal de synchronisation externe aux prises SYNC IN du lecteur et de l'enregistreur. Placer aussi les sélecteurs SYNC du lecteur et de l'enregistreur sur la position EXT.

COPIE DE BANDE

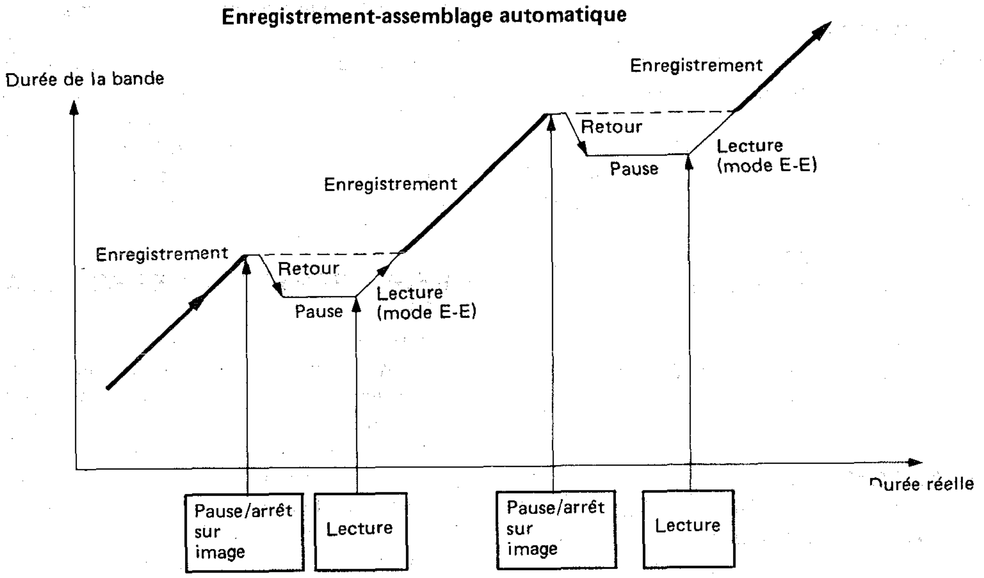
1. Raccorder ensemble les magnétoscopes lecteur et enregistreur suivant les instructions de la page 27.
2. Si le lecteur doit être asservi par un signal de synchronisation externe, placer le sélecteur SYNC du lecteur sur la position EXT.
3. Placer le sélecteur SYNC de l'enregistreur sur la position VIDEO.
4. Placer le sélecteur INPUT de l'enregistreur comme il convient.
   LINE: Placer sur cette position pour un doublage VIDEO-VIDEO.
   FM DUB: Placer sur cette position pour un doublage FM-FM.
   - Même lorsque le doublage FM-FM doit être effectué, prendre soin de raccorder la prise VIDEO OUT du lecteur à la prise VIDEO IN de l'enregistreur de la même manière que pour un doublage VIDEO-VIDEO.
5. Mettre le lecteur en mode lecture et l'enregistreur en mode enregistrement.

COMMANDE DE PAUSE ET ENREGISTREMENT-ASSEMBLAGE

Si vous désirez arrêter momentanément un enregistrement puis continuer à enregistrer à partir du dernier segment de l'enregistrement précédent, se servir de la touche PAUSE/STILL de la manière suivante, pour obtenir des enregistrements assemblés sans distorsion entre les différentes séquences.

1. Enfoncer la touche PAUSE/STILL pendant l'enregistrement. Le mode enregistrement est dégagé (l'indicateur d'enregistrement restant allumé) et la bande s'arrêtera dans le mode pause après s'être réembobinée automatiquement pendant deux secondes environ. En enfonçant à ce moment-là la touche PAUSE/STILL encore une fois, vous pouvez visionner l'image de l'enregistrement sur l'écran du moniteur, bien que celle-ci soit parfois monochrome.
2. Pour recommencer à enregistrer, enfoncer la touche PLAY. Le mode lecture est d'abord engagé (quoique le signal de sortie ne soit pas le signal de lecture de la bande, mais le signal d'entrée qui doit être enregistré). Quand la lecture atteint l'endroit où le segment précédent avait été arrêté à l'aide de la touche PAUSE/STILL (ce qui prend environ 2 secondes) le mode lecture est automatiquement commuté en mode enregistrement.

Enregistrement-assemblage automatique



DOUBLAGE FM-FM

Avec les magnétoscopes à cassette, le signal vidéo est tout d'abord converti en un signal à fréquence modulée (signal FM) et enregistré sur la bande. Durant la lecture, ce signal FM est capté de la bande et démodulé en un signal vidéo original. Par conséquent, lorsque certains enregistrements d'une bande sont reproduits et réenregistrés sur une autre bande (doublage ou montage), le procédé réel prend place de la manière suivante: le lecteur capte le signal FM provenant de la bande, le convertit en un signal vidéo original au travers de la démodulation et transmet le signal vidéo à l'enregistreur qui accepte ce signal vidéo en le convertissant en un signal FM et en enregistrant celui-ci sur la bande.
Cependant, dans le système de doublage FM-FM, le lecteur transmet le signal FM comme il a été capté sur la bande, sans le démoduler, et l'enregistreur enregistre directement le signal FM sur la bande. Cela signifie que dans le système de doublage FM-FM, le procédé de modulation et démodulation est éliminé, ce qui évite toute détérioration de la qualité des images inhérente à ce procédé. Par conséquent, le doublage FM-FM permet d'obtenir des copies de meilleure qualité comparé avec le système de doublage ordinaire (doublage VIDEO-VIDEO).
Il est essentiel aussi bien lors du doublage VIDEO-VIDEO que du doublage FM-FM que les systèmes d'asservissement de l'enregistreur soient synchronisés avec le signal à enregistrer. De ce fait, le doublage VIDEO-VIDEO utilise un signal de synchronisation verticale qui peut être séparé du signal vidéo d'entrée comme un signal de référence pour les systèmes d'asservissement. Cependant, dans le doublage FM-FM, il est difficile de séparer le signal de synchronisation verticale du signal d'entrée FM. Ceci nécessite l'utilisation d'un signal de synchronisation de référence séparé. Voici deux méthodes utilisables dans ce but:

1. Appliquer le signal vidéo démodulé provenant du lecteur (le signal de sortie disponible à la prise de sortie vidéo du lecteur) à la prise d'entrée vidéo de l'enregistreur. Dans ce cas, le sélecteur de synchronisation (SYNC) de l'enregistreur devra être placé sur VIDEO.
2. Appliquer le même signal de synchronisation externe aux prises d'entrée de synchronisation du lecteur et de l'enregistreur. Dans ce cas, les sélecteurs de synchronisation (SYNC) du lecteur et de l'enregistreur devront être placés sur EXT.

Remarque:

- Quand le sélecteur INPUT est mis sur FM DUB, le compteur de niveau vidéo VIDEO indique le niveau du signal d'entrée appliqué aux prises VIDEO IN.

DOUBLAGE SON

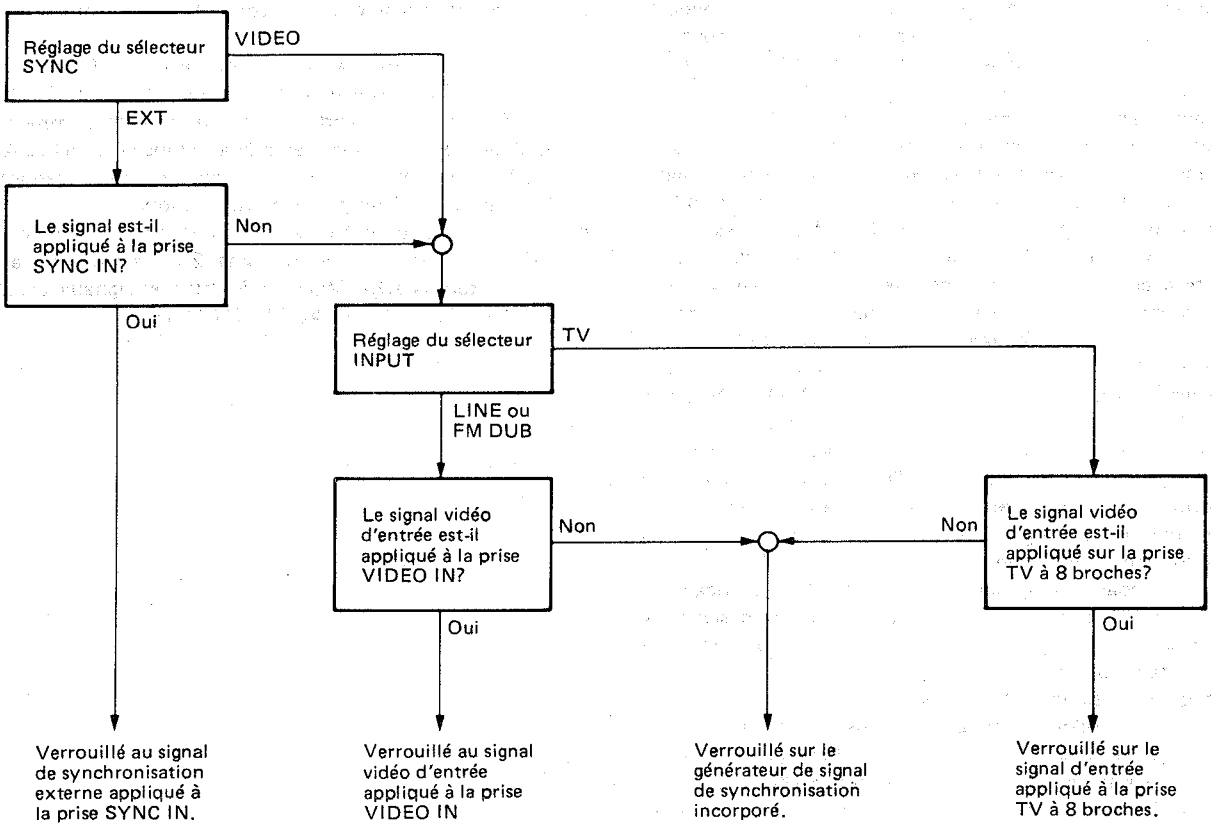
Si vous désirez n'enregistrer que des signaux audio quand vous lisez une cassette vidéo préenregistrée, utilisez le dispositif de doublage son. Le son en provenance d'une source reliée à la prise CH-1 AUDIO IN ou au jack CH-1 MIC peut être enregistré sur la piste du canal-1.

1. Raccorder une source à la prise qui convient.
2. Enfoncer simultanément la touche AUD-1 DUB et la touche PLAY pour commencer le doublage son.
3. Pour mettre fin au doublage son enfoncer la touche STOP.

- La fonction pause facilite le doublage son. D'abord lire la cassette vidéo préenregistrée puis enfoncer la touche PAUSE/STILL à l'endroit où vous désirez commencer le doublage. Puis enfoncer en même temps les touches AUD-1 DUB et PLAY. Ceci vous permet de faire démarrer le doublage à l'endroit précis de votre choix.
- Vous pouvez contrôler à la fois le son qui est en train d'être enregistré et celui du canal-2 en commutant à l'aide du sélecteur AUDIO MONITOR entre les signaux provenant des prises PHONES ou AUDIO MONITOR.

SIGNAUX DE SYNCHRONISATION DE REFERENCE POUR L'ENREGISTREMENT ET LA LECTURE

Le signal de synchronisation de référence pour les systèmes d'asservissement durant l'enregistrement et la lecture diffère, comme il est illustré ci-dessous, suivant les réglages des sélecteurs de synchronisation (SYNC) et d'entrée (INPUT) et des conditions des signaux appliqués aux bornes d'entrée.


Réglage du sélecteur SYNC
VIDEO
EXT
Le signal est-il appliqué à la prise SYNC IN?
Non
Oui
Réglage du sélecteur INPUT
TV
LINE ou FM DUB
Le signal vidéo d'entrée est-il appliqué à la prise VIDEO IN?
Non
Oui
Non
Le signal vidéo d'entrée est-il appliqué sur la prise TV à 8 broches?
Oui
Verrouillé au signal de synchronisation externe appliqué à la prise SYNC IN.
Verrouillé au signal vidéo d'entrée appliqué à la prise VIDEO IN
Verrouillé sur le générateur de signal de synchronisation incorporé.
Verrouillé sur le signal d'entrée appliqué à la prise TV à 8 broches.

PRECAUTIONS A PRENDRE LORS D'UN MONTAGE

Réglage de la phase horizontale
Pour donner des montages de la plus grande précision, ce magnétoscope est muni d'une commande de phase horizontale qui permet à la phase H du magnétoscope enregistreur d'être très précisément alignée sur celle du lecteur. Dans ce but procéder de la manière suivante:

1. Mettre la commande H-PHASE du lecteur sur sa position centrale de blocage.
2. Mettre l'enregistreur dans le mode montage par insertion.
3. Tout en commençant et en arrêtant plusieurs fois les montages par insertion, tourner la commande H-PHASE de l'enregistreur jusqu'à ce que l'indicateur à diode LED situé au dessus de la commande H-PHASE s'allume. Vous pouvez aussi vérifier sur l'écran du moniteur (moniteur à synchronisation interne) sur lequel le signal de synchronisation horizontale ne sera plus visible quand les deux phases H de l'enregistreur et du lecteur seront parfaitement alignées.

Commande et indicateur de phase horizontale (H-PHASE)
L'indicateur à diode LED situé au dessus de la commande H-PHASE sert à la fois d'indicateur d'asservissement image et de phase horizontale. En relation avec la commande d'asservissement image FRAME SERVO située sur le panneau arrière, cette diode LED fonctionne de la façon suivante:

1. Avec le commutateur FRAME SERVO sur ON
   Cet indicateur s'allume si le signal d'entrée qui doit être monté a la même phase horizontale que le signal vidéo de lecture. En pratique, avant de faire un montage, régler la commande H-PHASE pour que son indicateur s'éclaire.
   Remarques:
   - S'il n'y a pas de signal d'entrée, la commande H-PHASE ne fonctionne pas et l'indicateur s'éteint.
   - En enregistrement ou en montage, la commande H-PHASE fonctionne sans que son indicateur soit allumé.
2. Avec le commutateur FRAME SERVO sur OFF.
   L'indicateur reste éteint et la commande H-PHASE ne fonctionne pas.

Synchronisation du montage asservi
Le circuit d'asservissement du magnétoscope est verrouillé au signal d'entrée ou au signal de synchronisation externe quel que soit le mode de montage sélectionné.

Par conséquent, lorsque le sélecteur de synchronisation du magnétoscope est placé sur la position VIDEO, son circuit d'asservissement est affecté par les conditions de lecture du lecteur. Par exemple, si le lecteur est en mode arrêt sur image ou recherche, l'image de la lecture provenant de l'enregistreur (étant en mode de lecture) risque de ne plus être synchronisée.

Afin d'obtenir une image de lecture stable à partir de l'enregistreur, il est recommandé de mettre le lecteur en mode arrêt ou lecture (si la bande du lecteur ne contient que des enregistrements normaux), ou utiliser un signal de synchronisation externe en ayant au préalable placé le sélecteur de synchronisation sur la position EXT.

Le signal de synchronisation de référence des systèmes d'asservissement est différent en lecture et en enregistrement, ainsi que l'illustre la page 32, suivant les positions des sélecteurs SYNC et INPUT et la nature des signaux appliqués aux bornes d'entrée.

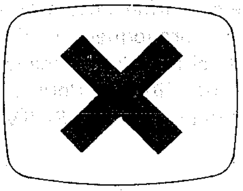
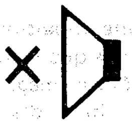
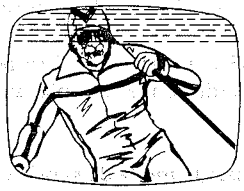
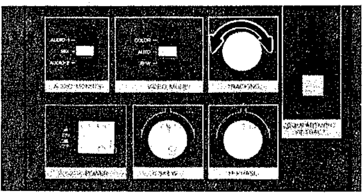
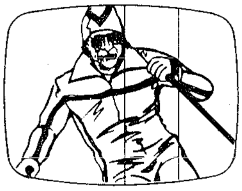
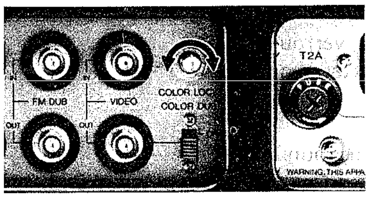
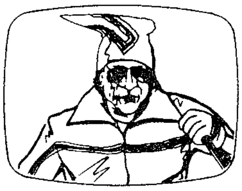
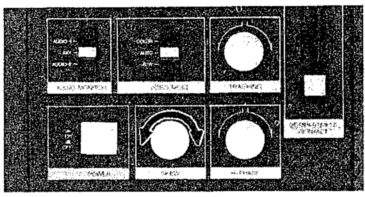
Commutateur d'asservissement image (FRAME SERVO)
Pendant un transfert de bande à bande, utiliser des bandes ayant un rapport signal/bruit faible, ou faire des copies de plus de trois générations, ou se servir de bandes enregistrées avec des caméras ITV à entrelacement intermittent ou montées par d'autres fabricants, risque de provoquer des distorsions d'image aux points de raccord. Ceci est dû à un mauvais fonctionnement de l'asservissement de l'image. Pour éviter ces phénomènes, mettre le commutateur FRAME SERVO sur la position OFF.

Synchronisation du moniteur dans les modes arrêt sur image et recherche
Le signal de lecture vidéo incorpore une impulsion de synchronisation verticale (impulsion V) de sorte que le moniteur reste synchronisé même dans les modes arrêt sur image et recherche. A cause de cette impulsion, si des moniteurs d'autres marques sont utilisés il se peut que la synchronisation horizontale soit partiellement perdue (la portion supérieure de l'image peut être distordue). Si jamais cela se produisait, débrancher la prise P129 d'impulsion fixe (STILL PULSE) du circuit de l'amplificateur de la tête (Pour de plus amples informations, consulter un revendeur JVC).

- Quand la prise STILL PULSE a été enlevée, il se peut que la synchronisation horizontale devienne instable, suivant la position des barres parasites.

Nous vous recommandons d'utiliser le mode de synchronisation externe
Le mode de synchronisation externe (EXT SYNC) stabilise tout le système d'asservissement, ce qui rend les images de lecture plus stables. Nous vous recommandons donc d'utiliser ce mode de synchronisation externe aussi souvent que possible.

GUIDE DE PREMIERE URGENCE

Symptômes	Points à vérifier	Remarques
Pas d'image, pas de son  	- Vérifier si le commutateur VTR/TV du moniteur de télévision est réglé sur la position VTR. Dans le cas contraire, le placer sur VTR.	- Pour de plus amples informations, se référer au manuel d'instructions du téléviseur.
Barres de parasites ou image brouillée 	- Vérifier pour voir si la commande d'alignement (TRACKING) est placée au centre. - Tourner doucement la commande d'alignement (TRACKING) jusqu'à ce que les parasites disparaissent. 	- Une fois la lecture de la bande particulière terminée remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.
Images en noir & blanc, de teintes incorrectes ou à bandes colorées 	- Tourner lentement la commande de réglage couleur (COLOR LOCK) jusqu'à ce que les couleurs redeviennent normales.  T2A IN FM DUB VIDEO OUT COLOR LOC COLOR DU WARNING: THIS APPA	- Les réglages de couleur, de teinte, de lumière et de contraste ne peuvent pas être effectués à l'aide de cette commande. - Une fois la lecture de la bande particulière terminée, remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.
Distorsion — La portion supérieure de l'image glisse horizontalement. 	- Utiliser la commande de distorsion (SKEW) pour corriger ce phénomène. - Tourner tout d'abord la commande de balayage vertical du téléviseur de sorte que la ligne d'image (correspondant à la période de suppression) puisse être vue et tourner lentement la commande de distorsion (SKEW) dans n'importe quelle direction jusqu'à ce que l'inclinaison de l'image soit corrigée. 	- Ne pas tourner la commande de distorsion (SKEW) durant l'enregistrement. - Une fois la lecture de cette bande terminée, remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.

CARACTERISTIQUES TECHNIQUES

GENERAL
Alimentation : CA 110/127/220/240 V∿, ±10 % 50/60 Hz, 120 W (130 W max. avec l'unité de commande de montage RM-88U)
Dimensions : 56,4(L) x 22,1(H) x 47,1(P) cm
Poids : 30,6 kg
Plage de température de fonctionnement : 5°C à 40°C
Position de fonctionnement : Horizontale seulement
Vitesse de défilement : 9,53 cm/s
Durée d'enregistrement : 60 mn max. avec une bande KCA-60 de JVC
Durée d'avance rapide et de retour arrière : 4 min. 30 sec. avec une cassette de 60 mn
Pleurage et scintillement : Inférieur à 0,15 % RMS

VIDEO
Système de lecture : Système à balayage hélicoïdal à deux têtes rotatives
Luminance : Enregistrement FM
Signal couleur : Enregistrement direct de sous-porteuse convertie
Système de signal vidéo : Signaux couleur de type PAL et signal CCIR standard, 625 lignes
Entrée Ligne/TV : 0,5 – 2,0 Vcc, 75 ohms
Doublage FM : 0,5 Vcc, 75 ohms
Sortie Ligne/TV : 1,0 Vcc, 75 ohms
Doublage FM : 0,5 Vcc, 75 ohms
Rapport signal/bruit : Supérieur à 46 dB (couleur) Supérieur à 48 dB (noir et blanc) (mesureur de bruit Rohde & Schwarz)
Résolution horizontale : Monochrome 330 lignes
Couleur 250 lignes
Entrée de sous-porteuse : 2,0 Vcc, 75 ohms
Entrée de synchronisation : 0,5 – 4,0 Vcc, 75 ohms
Sélecteur d'entrée : TV/LINE/FM DUB
Sélecteur de mode vidéo : COLOR/AUTO/BW
Sélecteur de synchronisation : EXT/VIDEO (INT)

AUDIO
Entrée Ligne : -20/0 dBs, 10 k-ohms, symétrique
Micro : -70 dBm, 600 ohms, asymétrique
TV : -20 dBs, 10 k-ohms, asymétrique
Sortie Ligne : -20/0 dBs, basse impédance, symétrique
Contrôle : 0 dBs, basse impédance, symétrique
Casque d'écoute : -28 dBs, 8 ohms de charge, asymétrique
TV : 0 dBs, basse impédance, asymétrique
Rapport signal/bruit : Supérieur à 48 dB (niveau de distorsion de 3 %)
Réponse de fréquence : 50 à 15,000 Hz
Sélecteur d'entrée : TV/LINE/MIC
Sélecteur de sortie de contrôle : CH-1/MIX/CH-2

CONNECTEURS
Sortie HF : Connecteur d'antenne
Entrée/sortie vidéo : Connecteur BNC
Entrée/sortie de doublage FM : Connecteur BNC
Entrée de synchronisation/ sous-porteuse : Connecteur BNC
Audio Entrée/sortie de ligne: Prise XLR
Sortie de contrôle : Prise XLR
Casque d'écoute : Prise de 6 mm
Entrée/sortie TV : Connecteur TV à 8 broches EIAJ
Entrée secteur : Prise IEC à 3 fils
Télécommande : Connecteur à 45 broches

ACCESSOIRES : Câble de contrôle
Couvercle anti-poussière

Présentation et caractéristiques modifiables sans préavis.

CR-6650E
FARB-VIDEO-KASSETTEN-REKORDER

ACHTUNG:

SCHÜTZEN SIE DIESES GERÄT VOR REGEN UND FEUCHTIGKEIT, DAMIT ES NICHT IN BRAND GERÄT ODER EIN KURZSCHLUSS ENTSTEHT.

SPANNUNGSVERSORGUNG

Anschluß an das Netz

Die Betriebsspannung dieses Gerätes ist werkseitig auf 240 V Wechselspannung eingestellt.

Überprüfen Sie, ob der Spannungswähler auf der Geräterückseite auf Ihre Netzspannung eingestellt ist, bevor Sie das Gerät an das Netz anschließen.

Einstellung auf örtliche Netzspannung

Dieses Gerät kann mit 110, 127, 220 oder 240 V Wechselspannung betrieben werden. Wenn die voreingestellte Spannung nicht mit Ihrer örtlichen übereinstimmt, stellen Sie den Spannungswähler neu ein. Führen Sie einen Schraubenzieher in den Schlitz des Spannungswählers ein und drehen Sie ihn, bis die korrekte Spannung angezeigt ist.

WICHTIG: Fernsehprogramme dürfen nur aufgenommen werden, wenn dadurch Autorenrechte oder andere Rechte Dritter nicht verletzt werden.

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VORSICHTSMASSNAHMEN

Betrieb und Lagerung

- Vermeiden Sie den Betrieb des CR-6650E unter folgenden Bedingungen:
  - an extrem heißen, kalten oder feuchten Orten
  - an staubigen Plätzen
  - in der Nähe von Geräten mit starkem magnetischem Feld
  - an starken Erschütterungen ausgesetzten Plätzen und
  - an schlecht belüfteten Plätzen.
- Vermeiden Sie Kondensationsfeuchtigkeit auf dem Gerät. Betreiben Sie den CR-6650E nicht gleich nach der Verlagerung von einem kalten an einen warmen Ort. Der Wasserdampf in der warmen Luft schlägt sich auf der noch kalten Videokopftrommel und Bandführung nieder, und diese Feuchtigkeit kann zu Schäden an Band und Rekorder führen.
- Behandeln Sie den CR-6650E schonend.
  - Die mitgelieferte Schutzhaube nicht beim Betrieb auf den Rekorder setzen.
  - Verdecken Sie nicht die Belüftungsöffnungen.
  - Stellen Sie nichts auf das Gerät, das durch Verschütten die Innenteile des Rekorders schädigen könnte.
  - Betreiben Sie das Gerät nur in horizontaler Stellung.

- Beim Transport ist zu beachten:
  - Der Rekorder darf beim Verpacken und Transportieren keinen starken Erschütterungen ausgesetzt werden.
  - Die Kassette muß vor dem Verpacken aus dem Gerät entfernt werden.

Video-Kassetten

- Verwenden Sie 3/4" U-Standard-Videokassetten des Typs KCA. Sie können mit diesem Rekorder aber auch die kleineren KCS-20-Kassetten verwenden. Um die KCS-20-Kassette in den Rekorder einzulegen, müssen Sie die Kassettenführungsrille mit dem Führungswulst auf dem Kassettenhalter ausrichten.
- Beim Aufnehmen und Schneiden muß die rote Kappe an der Rückseite der Kassette angebracht sein. Ohne diese Kappe ist Aufnehmen und Schneiden nicht möglich. Wenn diese Kappe entfernt ist, sind die Aufnahmen gegen unbeabsichtigtes Löschen geschützt.

MERKMALE

Direktantrieb-Motoren für Kopftrommel und Capstan
Die Kopftrommel und der Capstan werden von kollektorlosen Direktantrieb-Gleichstrom-Motoren angetrieben und bieten daher ausgezeichnete Stabilität und Dauerhaftigkeit.

Hohe Zuverlässigkeit und Dauerhaftigkeit durch Aluminium-Druckguß-Chassis
Die hohe Zuverlässigkeit und hohe Dauerhaftigkeit des Bandtransportmechanismus werden durch das Aluminium-Druckguß-Chassis, das zweimotorige zahnradgetriebene Bandladesystem und den elektrisch betriebenen Kassetten-Auswurfmechanismus gewährleistet.

Spulen-Servosystem mit unabhängigen Spulenmotoren
Die Stabilität des Bandtransports wird verbessert durch unabhängige Motoren für die Abwickel- und für die Aufwickelspule und durch das Spulen-Servosystem, das die Bandspannung nicht nur bei Aufnahme und Wiedergabe, sondern auch beim Schnellvorlauf und Rückspulen konstant hält, so daß das Band bei niedriger oder hoher Geschwindigkeit nicht überlastet wird.

Kopf-zu-Kopf-Kopieren für verbesserte Kopien
Das Kopf-zu-Kopf-Kopiersystem, bei dem das komplette Videosignal (Chroma und Luminanz) ohne Modulation und Demodulation übertragen wird, reduziert die Abnahme der Bildqualität beim Kopieren. Dieses System macht den CR-6650E zum idealen Master-Rekorder bei Software-Produktionen und Zuspieler in Kopier- und Schnitt-Systemen.

Professionelle Anschlußbuchsen
Für die Video-Ein- und Ausgänge werden BNC-Anschlüsse und für die Audio-Ein- und Ausgänge werden 3-pol. symmetrische XLR-Anschlüsse verwendet.

H-Phasen-Regler
Der CR-6650E ist mit einem Horizontalphasen-Regler ausgestattet, so daß er für genauere Schnitte präzise mit der Horizontalphase des Zuspielers synchronisiert werden kann.

Videopegel-Meßinstrument mit Regelvorrichtung
Bei der Aufnahme wird der Pegel des Videosignals angezeigt, so daß der Video-Aufnahmestrom optimal eingestellt werden kann.

Tracking-Meßinstrument
Zur genauen Einstellung der Spurlage ist der CR-6650E mit einem unabhängigen Tracking-Meßinstrument ausgestattet.

Geschwindigkeitsregler
Mit dem Geschwindigkeitsregler der Schnittsteuereinheit (Sonderzubehör) kann die Wiedergabegeschwindigkeit stufenlos von Null (Standbild) bis zur 5-fachen Normalgeschwindigkeit in Vorwärts- und Rückwärtsrichtung eingestellt werden.

Logische Steuerung mit Mikroprozessor
Die logische Steuerung mit einem Mikroprozessor ermöglicht direkten Betriebsartenwechsel. Es ist nicht erforderlich, zuerst die Stop-Taste zu drücken. Ebenso erlaubt der Mikroprozessor die Fernbedienung aller wichtigen Funktionen des Rekorders.

Capstan-Servosystem für externe Synchronisation
Das Capstan-Servosystem ermöglicht die Wiedergabe mit einem externen Sync-Signal. Der Eingang für ein externes Hilfsträgersignal ermöglicht den Anschluß eines Zeitfehler-Ausgleichers (TBC).

Automatischer Rücklauf
Wenn während der Aufnahme die Pausetaste gedrückt wird, wird das Band automatisch um etwa 2 Sekunden Programmzeit zurückgefahren und stoppt dann.

Elektronisches Echtzeit-Bandzählwerk
Das elektronische Bandzählwerk mit einem leicht abzulesenden Fluoreszenz-Display zeigt die abgelaufene Zeit bis zu 59 Minuten 59 Sekunden und erleichtert das Indexieren.

Automatische Such-Funktion
Diese Funktion erfolgt in Verbindung mit dem Bandzählwerk, so daß jede Bandstelle automatisch gesucht werden kann.

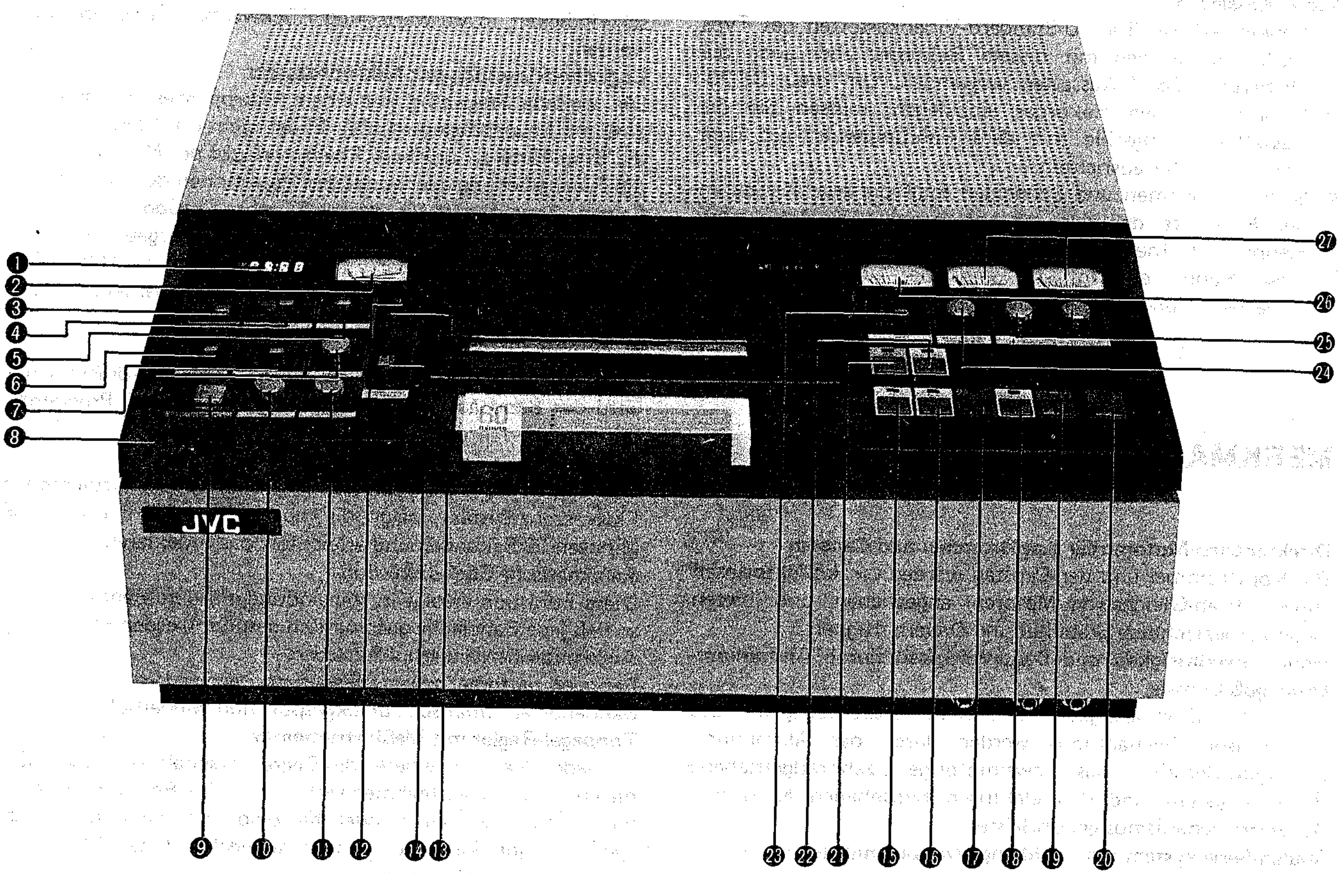
Automatische Wiederhol-Funktion
Bei der automatischen Wiederholung wird das Band am Bandende automatisch zurückgespult und wiederholt.

Tonpegel-Regler mit Meßinstrumenten
Für jeden Kanal ist eine Audio-Begrenzerschaltung vorgesehen, die übersteuerte Aufnahmen verhindern. Der Begrenzer kann je nach Bedarf für einen oder für beide Kanäle ausgeschaltet werden, dann kann der Aufnahmepegel mit den Meßinstrumenten eingestellt werden.

Bereitschafts-Betriebsart
Wenn in irgendeiner Betriebsart die Stop-Taste gedrückt wird, schaltet das Gerät auf Bereitschaft. In dieser Betriebsart bleibt das Band eingefädelt, so daß unmittelbar auf Aufnahme- oder Wiedergabe-Betrieb geschaltet werden kann.

BEDIENELEMENTE UND ANSCHLUSSBUCHSEN

BEDIENFELD



❶ **Bandzählwerk**
Das 4-stellige Echtzeit-Bandzählwerk zeigt die abgelaufene Bandmenge bis 59 Minuten 59 Sekunden.

❷ **Spurlagen-Meßinstrument (TRACKING)**
Zur Einstellung der Spurlage den TRACKING-Regler ❽ so einstellen, daß die Nadel dieses Meßinstruments maximal ausschlägt.

❸ **Zählwerk-Rückstelltaste (COUNTER RESET)**
Zum Zurückstellen des Bandzählwerks auf 00:00.

❹ **Auto-Betriebsart-Schalter (AUTO MODE)**
Dieser Schalter dient zum Wählen der automatischen Betriebsart in Bezug zum Rückspulen.

SEARCH:	Das Band stoppt automatisch, wenn es bis zu dem Punkt zurückgespult ist, der der Zählwerk-Anzeige "00:00" entspricht, und das Gerät schaltet auf die Stop-Betriebsart.
OFF:	Kein automatischer Betrieb.
REPEAT:	Wenn das Band zum Beginn zurückgespult ist, stoppt es automatisch und wird dann automatisch wieder eingefädelt, um die Wiedergabe zu wiederholen.

❺ **Synchronisation-Wahlschalter (SYNC)**
Zur Wahl zwischen verschiedenen Referenz-Sync-Signalen für die Servosysteme bei Aufnahme und Wiedergabe. Für weitere Informationen siehe "REFERENZ-SYNC-SIGNALE FÜR AUFNAHME UND WIEDERGABE" auf Seite 14.

❻ **Tonkontroll-Wahlschalter (AUDIO MONITOR)**
Dieser Schalter wählt den Tonausgang, der am 8-pol. TV-Anschluß, der Kopfhörerbuchse oder dem AUDIO MONITOR-Anschluß anliegt.

AUDIO-1:	Zum Hören des Tons von Kanal 1.
MIX:	Zum Hören des gemischten Tons von Kanal 1 und Kanal 2.
AUDIO-2:	Zum Hören des Tons von Kanal 2.

⑦ **Videobetriebsart-Wahlschalter (VIDEO MODE)**
Entsprechend des Eingangssignals bei der Aufnahme oder des Ausgangssignals bei der Wiedergabe eine der drei Positionen wählen.

COLOUR: Auf diese Position stellen, wenn das Eingangs- oder Wiedergabe-Videosignal ein Farbsignal ist.

AUTO: In dieser Stellung wird der Schaltkreis automatisch zwischen Farbe und Schwarz/Weiß geschaltet und ermöglicht so optimale Aufnahme und Wiedergabe. In dieser Position wird bei Schwarz/Weiß-Signalen eine höhere Bildauflösung erzielt. Der Schalter sollte normalerweise in dieser Position stehen.

B/W: Auf diese Position stellen, wenn das Eingangs- oder Wiedergabesignal ein Monochromsignal ist. Dann wird eine höhere Bildauflösung erzielt.

- Eine LED-Anzeige ist vorhanden, um versehentliches Aufnehmen von Farbsignalen in Schwarz/Weiß zu verhindern. Diese LED leuchtet, wenn der Schalter auf B/W steht.

⑧ **Spurlagen-Regler (TRACKING)**
Diesen Regler so drehen, daß das TRACKING-Meßinstrument ❷ maximal ausschlägt, um Störzeilen bei der Wiedergabe zu entfernen.

⑨ **Netzschalter (POWER)**
Zum Einschalten der Spannungsversorgung diesen Schalter drücken. Die Pegel-Meßinstrumente und das Zählwerk-Display sind erleuchtet. Durch nochmaliges Drücken wird die Spannungsversorgung wieder ausgeschaltet.

⑩ **Schrägverzerrungs-Regler (SKEW)**
Diesen Regler drehen, um das Wiedergabebild zu korrigieren, wenn der obere Teil horizontal verzerrt ist.

⑪ **Horizontalphasen-Regler (H-PHASE)**
Zum Angleichen der Horizontalphase des CR-6650E an die des angeschlossenen Zuspielers für genaueres Schneiden. Wenn der Rekorder und der Zuspieler phasengleich sind, leuchtet die LED-Anzeige.

⑫ **Warn-Anzeige (WARNING)**
Diese LED leuchtet in den folgenden Fällen. Dann werden alle Funktionen gestoppt.

1) Wenn der Bandtransport nicht ordnungsgemäß funktioniert und kein Band ab- oder aufgewickelt wird.
2) Wenn die Bandende-Abtastlampe abgetrennt ist.
3) Wenn der Trommelmotor stoppt.
4) Wenn der Kondensations-Sensor anspricht.
   - Wenn diese LED leuchtet, die Spannungsversorgung sofort ausschalten.

⑬ **Servoverriegelung-Anzeige (SERVO LOCK)**
Leuchtet, wenn das Servosystem für normalen Betrieb verriegelt ist.

⑭ **Kassettenfach-Rückzieh-Hebel (COMPARTMENT RETRACT)**
Diesen Hebel nach hinten ziehen, um das leere Kassettenfach zurückzuziehen. Wenn der Rekorder nicht in Betrieb ist, sollte das Kassettenfach in der zurückgezogenen Position sein.

- Diesen Hebel nur zum Zurückziehen des leeren Kassettenfachs und nicht zum Einlegen einer Kassette verwenden.

⑮ **Schnellvorlauf-Taste (FF)**
Diese Taste hat zwei Funktionen: Schnellvorlauf und Vorwärts-Suche. Diese Taste kann in jeder Betriebsart außer bei Aufnahme gedrückt werden. Wenn sie bei der Wiedergabe gedrückt wird, wird auf Vorwärts-Suche geschaltet. Das Band läuft dann mit etwa der 15-fachen Normalgeschwindigkeit. In beiden Funktionen, Schnellvorlauf und Vorwärts-Suche, leuchtet die FF-Anzeige. Zum Freigeben des Schnellvorlaufs und der Vorwärts-Suche eine Taste entsprechend der nächsten gewünschten Betriebsart außer REC und EJECT drücken.

⑯ **Rückspul-Taste (REW)**
Diese Taste hat zwei Funktionen: Rückspulen und Rückwärts-Suche. Diese Taste kann in jeder Betriebsart außer bei Aufnahme gedrückt werden. Wenn sie bei der Wiedergabe gedrückt wird, wird auf Rückwärts-Suche geschaltet. Dann läuft das Band mit etwa der 15-fachen Normalgeschwindigkeit. In beiden Funktionen, Rückspulen und Rückwärts-Suche, leuchtet die REW-Anzeige. Zum Freigeben des Rückspulens und der Rückwärts-Suche eine Taste entsprechend der nächsten gewünschten Betriebsart außer REC und EJECT drücken.

⑰ **Wiedergabe-Taste (PLAY)**
Diese Taste zum Starten der Wiedergabe drücken. Die PLAY-Anzeige leuchtet. Für Aufnahmestart zusammen mit der REC-Taste drücken. Die PLAY-Taste kann in der FF- und REW-Betriebsart direkt gedrückt werden, ohne daß zuerst die STOP-Taste gedrückt werden muß.

⑱ **Pause/Standbild-Taste (PAUSE/STILL)**
Diese Taste zum Unterbrechen des Bandlaufs bei Aufnahme und Wiedergabe drücken. Zum Freigeben der Pause- oder Standbild-Betriebsart eine Taste entsprechend der als nächstes gewünschten Betriebsart außer EJECT drücken. Durch Drücken der STOP-Taste in jeder Betriebsart außer Bereitschaft leuchten die PAUSE/STILL- und die STOP-Anzeige, und der Rekorder schaltet auf die Bereitschafts-Betriebsart.

⑲ **Stop-Taste (STOP)**
Wenn eine Kassette eingelegt wird, wird das Band automatisch teilweise eingefädelt und gestoppt (dieser Zustand wird als Stop-Betriebsart bezeichnet). Die STOP-Anzeige bleibt erleuchtet.

Zum Einschalten der Bereitschafts-Betriebsart in jeder Betriebsart die STOP-Taste einmal drücken. Die STOP-Taste noch einmal drücken, um auf die Stop-Betriebsart zu schalten.

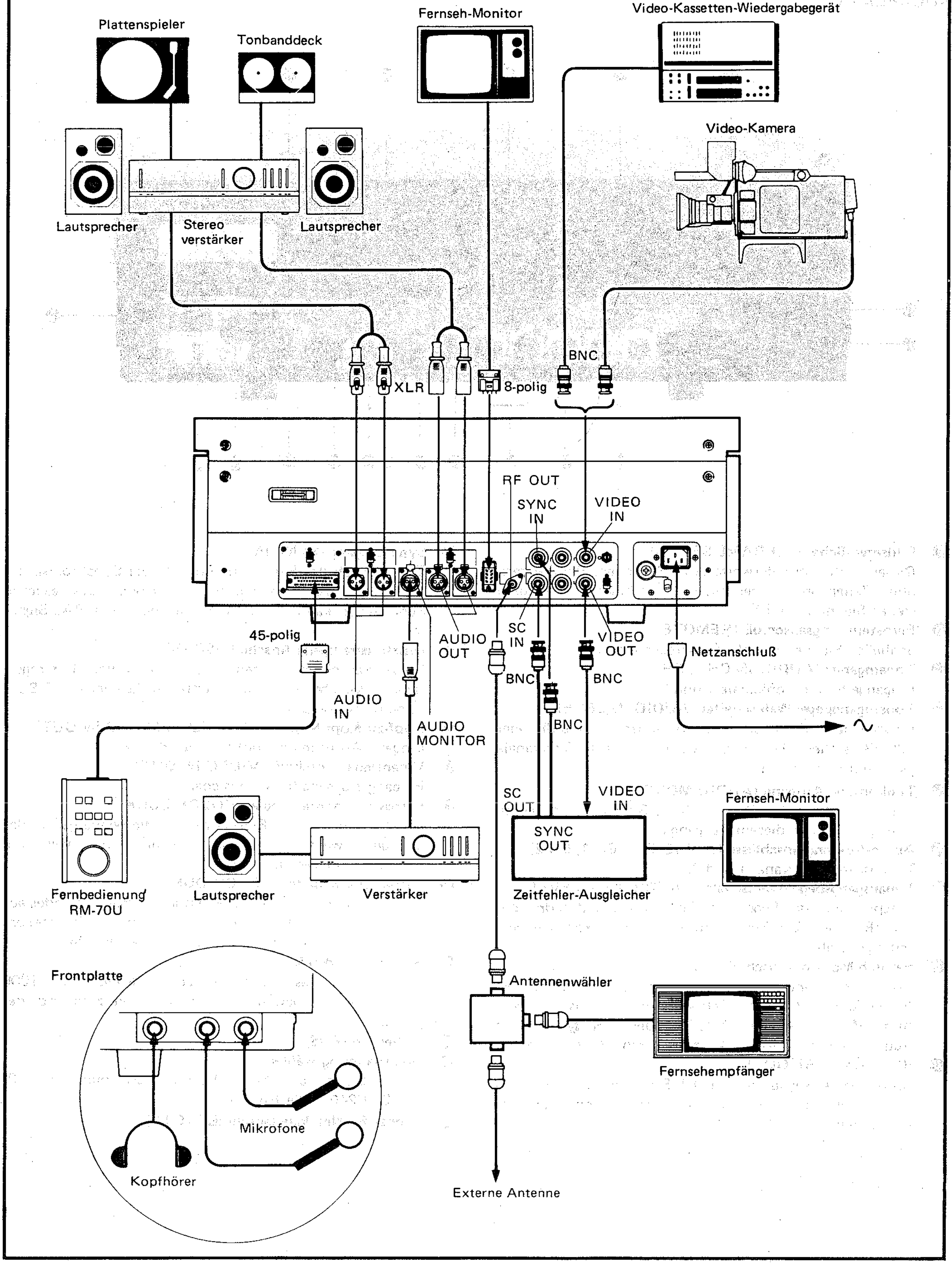
⑳ **Auswurf-Taste (EJECT)**
Diese Taste zum Auswerfen der Kassette drücken. Die Kassette kann nur in der Stop- und der Bereitschafts-Betriebsart ausgeworfen werden. Wenn die EJECT-Taste gedrückt wird, nachdem die STOP-Taste gedrückt wurde, fängt die LED-Anzeige über der EJECT-Taste an zu blinken. Nachdem das Band in die Kassette zurückgezogen wurde, wird die Kassette automatisch ausgeworfen.

㉑ **Aufnahme-Taste (REC)**
Diese Taste zusammen mit der PLAY-Taste zum Starten der Aufnahme des Ton- und Videosignals drücken. Wenn die REC-Taste während der Wiedergabe gedrückt wird, schaltet der Monitorschirm um vom Wiedergabebild zum E-E-Bild, so daß die Signale überwacht werden können, die an den Eingängen anliegen.

㉒ **Kanal-1-Nachvertonung-Taste (AUDIO-1 DUB)**
Der Tonkanal 1 kann nachvertont werden. Für die Nachvertonung diese Taste zusammen mit der PLAY-Taste drücken.

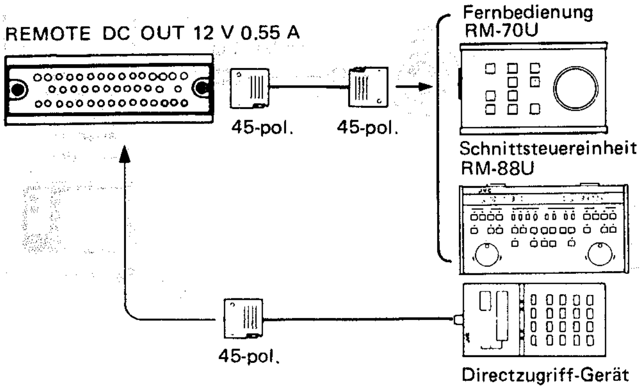
ANSCHLÜSSE

ANSCHLÜSSE VON VIDEO- UND AUDIOGERÄTEN

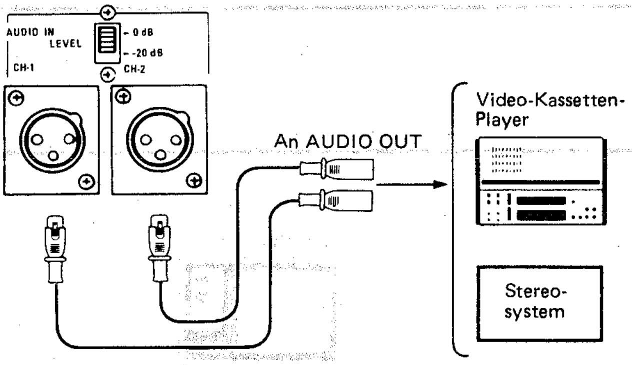


Fernseh-Monitor
Video-Kassetten-Wiedergabegerät
Plattenspieler
Tonbanddeck
Video-Kamera
Lautsprecher
Stereo verstärker
Lautsprecher
BNC
XLR
8-polig
RF OUT
SYNC IN
VIDEO IN
45-polig
AUDIO OUT
SC IN
VIDEO OUT
Netzanschluß
BNC
BNC
BNC
AUDIO IN
AUDIO MONITOR
SC OUT
VIDEO IN
Fernseh-Monitor
SYNC OUT
Fernbedienung RM-70U
Lautsprecher
Verstärker
Zeitfehler-Ausgleicher
Frontplatte
Antennenwähler
Fernsehempfänger
Mikrofone
Kopfhörer
Externe Antenne

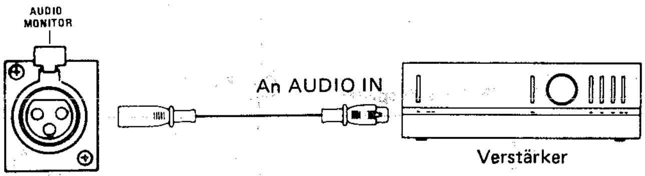
1. REMOTE-Anschluß (45-pol.)


REMOTE DC OUT 12 V 0.55 A
45-pol.
45-pol.
Fernbedienung RM-70U
Schnittsteuereinheit RM-88U
45-pol.
Directzugriff-Gerät

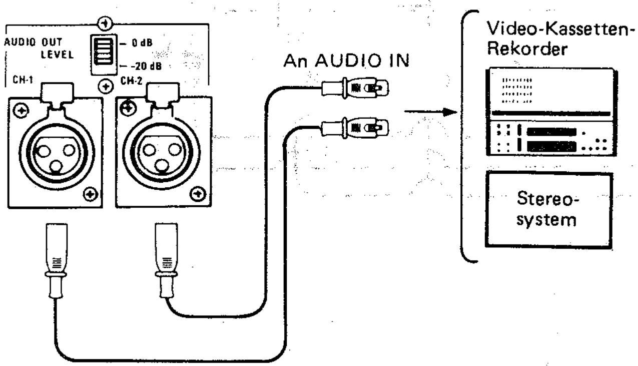
2. AUDIO IN-Anschluß (XLR)


AUDIO IN LEVEL
- 0 dB
- -20 dB
CH-1
CH-2
An AUDIO OUT
Video-Kassetten-Player
Stereo-system

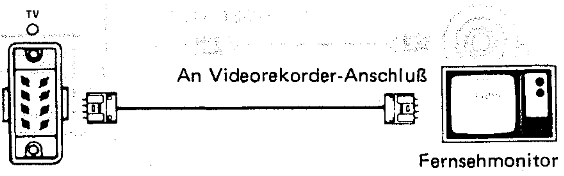
3. AUDIO MONITOR-Anschluß (XLR)


AUDIO MONITOR
An AUDIO IN
Verstärker

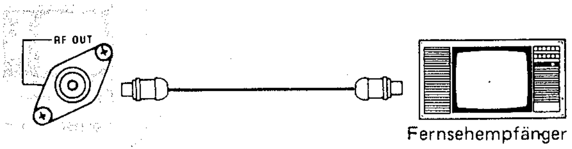
4. AUDIO OUT-Anschluß (XLR)


AUDIO OUT LEVEL
- 0 dB
- -20 dB
CH-1
CH-2
An AUDIO IN
Video-Kassetten-Rekorder
Stereo-system

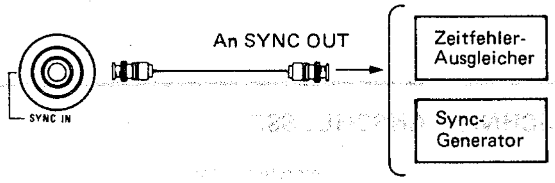
5. TV-Anschluß (8-pc


TV
An Videorekorder-Anschluß
Fernsehmonitor

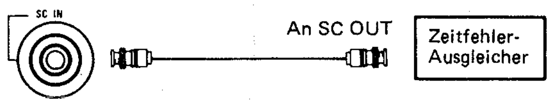
6. RF OUT-Anschluß (Antenne)


RF OUT
Fernsehempfänger

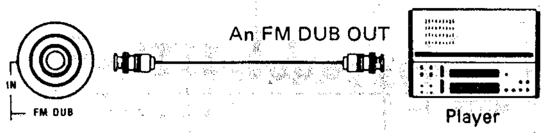
7. EXTERNAL SYNC IN-Anschluß (BNC)


An SYNC OUT
SYNC IN
Zeitfehler-Ausgleicher
Sync-Generator

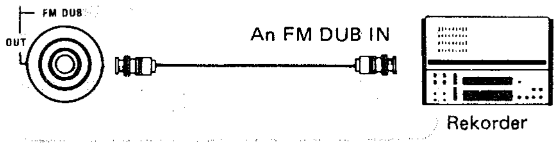
8. SC IN-Anschluß (BNC)


SC IN
An SC OUT
Zeitfehler-Ausgleicher

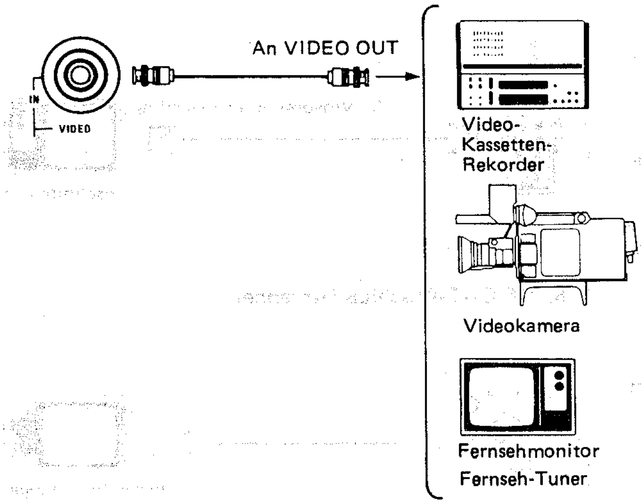
9. FM DUB IN-Anschluß (BNC)


An FM DUB OUT
IN
FM DUB
Player

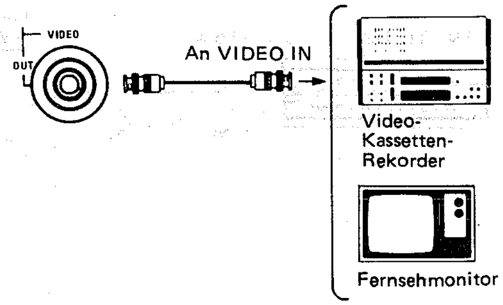
10. FM DUB OUT-Anschluß (BNC)


FM DUB
OUT
An FM DUB IN
Rekorder

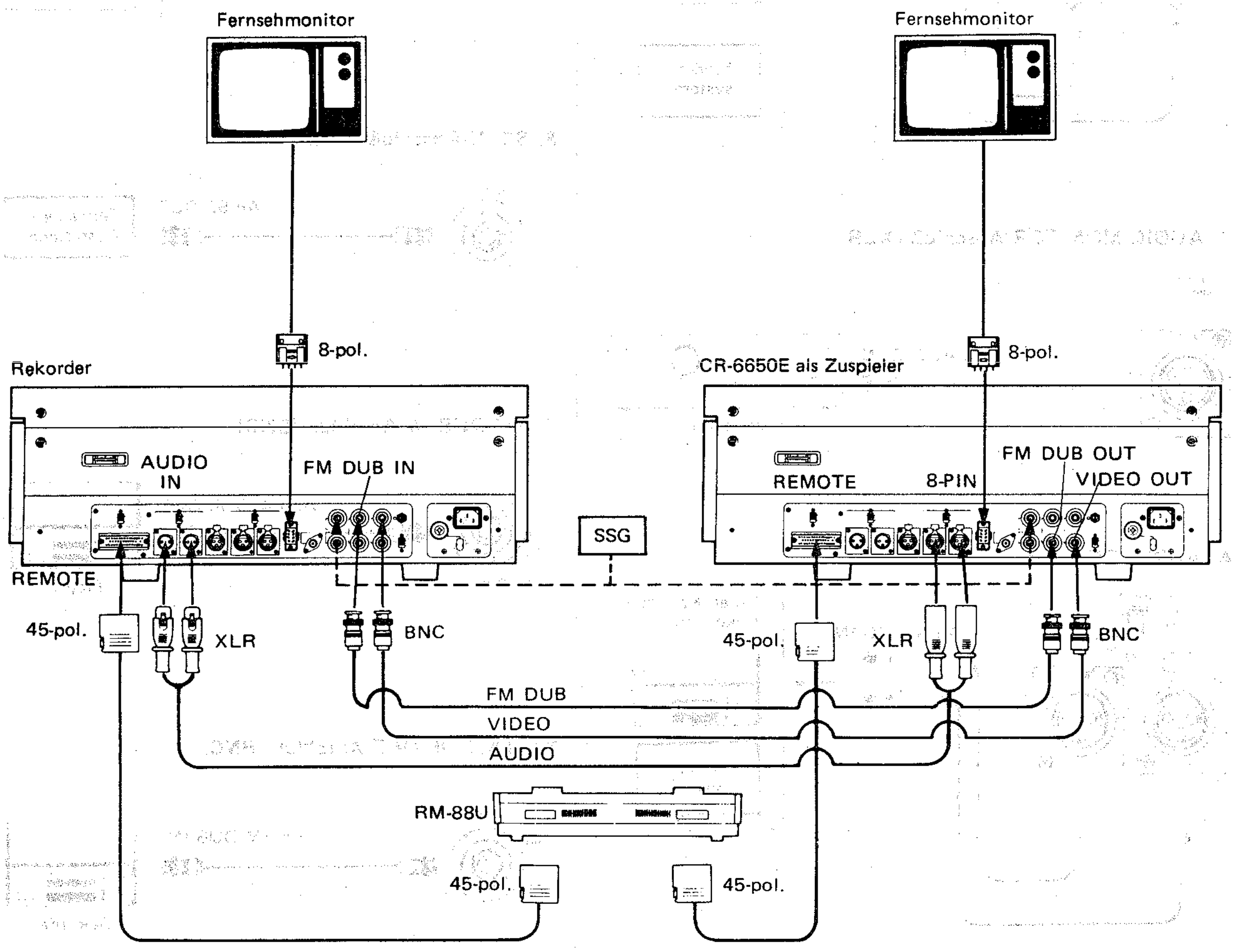
11. VIDEO IN-Anschluß (BNC)


IN
VIDEO
An VIDEO OUT
Video-Kassetten-Rekorder
Videokamera
Fernsehmonitor
Fernseh-Tuner

12. VIDEO OUT-Anschluß (BNC)


VIDEO
OUT
An VIDEO IN
Video-Kassetten-Rekorder
Fernsehmonitor

SCHNITT-ANSCHLÜSSE


Fernsehmonitor
Fernsehmonitor
Rekorder
8-pol.
CR-6650E als Zuspieler
8-pol.
AUDIO IN
FM DUB IN
REMOTE
SSG
REMOTE
8-PIN
FM DUB OUT
VIDEO OUT
45-pol.
XLR
BNC
45-pol.
XLR
BNC
FM DUB
VIDEO
AUDIO
RM-88U
45-pol.
45-pol.

EINLEGEN EINER VIDEOKASSETTE

1. Die POWER-Taste auf ON drücken.
2. Die EJECT-Taste drücken, das Kassettenfach wird automatisch ausgefahren.
   - Wenn Sie eine Aufnahme oder einen Bildschnitt machen wollen, achten Sie darauf, daß die rote Kappe an der Rückseite der Kassette aufgesteckt ist. Ohne diese Kappe sind Aufnahme und Bildschnitt nicht möglich. Nehmen Sie diese Kappe jedoch ab, wenn Sie eine Aufnahme vor unbeabsichtigtem Löschen bewahren wollen.
3. Eine Videokassette ganz in das Kassettenfach einschieben. Das Kassettenfach wird automatisch zurückgezogen, und das Gerät schaltet auf die Stop-Betriebsart, die Stop-LED-Anzeige leuchtet.
   - Wenn das Kassettenfach nicht automatisch zurückgezogen wird, überprüfen, ob die Kassette richtig eingelegt ist. Nicht versuchen, das Kassettenfach (mit eingelegter Kassette) mit dem COMPARTMENT RETRACT-Hebel zurückzuziehen.

BEREITSCHAFTS-BETRIEBSART

Wenn sich das Gerät in der Stop-Betriebsart befindet, die PAUSE/STILL- und die STOP-Taste gleichzeitig drücken, um auf Bereitschaft zu schalten. Um aus einer anderen Betriebsart auf Bereitschaft zu schalten, braucht nur die STOP-Taste gedrückt zu werden. Wenn die STOP-Taste noch einmal gedrückt wird, wird wieder auf die Stop-Betriebsart geschaltet.

Hinweis:
Wenn die Spannung ausgeschaltet wird, während das Kassettenfach ausgefahren wird, wird der Auswurfvorgang nicht fortgesetzt, wenn die Spannung wieder eingeschaltet wird. Zum Ausfahren des Kassettenfachs die EJECT-Taste noch einmal drücken, nachdem die Spannung wieder eingeschaltet ist.

WIEDERGABE

BEDIENUNG FÜR WIEDERGABE

- Normalerweise sollte der VIDEO MODE-Wahlschalter auf AUTO stehen. Bei der Wiedergabe von Monochrom-Aufnahmen kann er auf B/W gestellt werden. Dann leuchtet die B/W-LED-Anzeige.

1. Die PLAY-Taste drücken. Die PLAY-LED-Anzeige leuchtet, und die Wiedergabe startet.
2. Stellen Sie die Spurlagen (TRACKING)- und Schrägverzerrungs (SKEW)-Regler so ein, daß Sie eine optimale Bildwiedergabe erhalten.
   - Wenn die Farbe des Wiedergabebildes ungewöhnlich ist, müssen Sie sie mit dem Farbsynchronisier-Regler (COLOR LOCK) an der Rückseite des Gerätes entsprechend einstellen.
   - Wenn Sie das Signal für den Eingangsanschluß während der Wiedergabe überwachen wollen, müssen Sie bei Wiedergabebetrieb die Aufnahmetaste (REC) drücken. Das Eingangssignal wird dann auf der Monitorscheibe erscheinen.
   - Nicht die REC- und die PLAY-Taste gleichzeitig drücken, weil sonst die Aufnahme startet und die alten Aufnahmen auf dem Band gelöscht werden.
3. Wenn Sie das Standbild betrachten wollen, müssen Sie während der Aufnahme die Pause/Standbild-Taste (PAUSE/STILL) drücken. Drücken Sie die Wiedergabetaste (PLAY), wenn Sie den Standbildbetrieb beenden wollen.
   - Wenn das Bandende erreicht wird, schaltet das Gerät auf Rückspulen.

Hinweis:
Wenn aus der Stop-Betriebsart auf Wiedergabe geschaltet wird, kann das Bild in den ersten 1 bis 2 Sekunden wandern, und es erscheinen eventuell keine Farben. Um dies zu vermeiden, sollte die Wiedergabe aus der Bereitschafts-Betriebsart gestartet werden.

WIEDERGABE MIT EXTERNER SYNCHRONISATION

Wenn Sie die Wiedergabe mit einem externen Sync-Signal synchronisieren wollen, müssen Sie folgendermaßen vorgehen:

1. Versehen Sie den Sync-Eingangsanschluß (SYNC IN) mit einem Sync-Signal. Verwenden Sie dazu ein Sync-Signal oder ein BAS-Signal.
2. Stellen Sie den SYNC-Wahlschalter auf Extern (EXT) ein.
3. Drücken Sie die Wiedergabetaste (PLAY), um die Wiedergabe zu beginnen.

WIEDERGABE MIT EINEM FERNSEHEMPFÄNGER

Bei Benutzung eines zusätzlichen HF-Modulators ist der CR-6650E in der Lage, ein Band mit einem Fernsehempfänger abzuspielen. Um den HF-Modulator einzubauen, beraten Sie sich mit Ihrem JVC-Fachhändler.

Wenn Sie einen HF-Modulator zur Wiedergabe mit einem Fernsehempfänger benutzen, ist es nötig, den Kanalwähler des Fernsehempfängers auf den gleichen Kanal wie den des HF-Modulators einzustellen.

HF-Modulator Modell	Bestimmungsland	Kanal
KR-250EG	Europa Kontinent*	Kanal 43—47 auf dem UHF-Band nach dem Kontinental-Europa-Standard
KR-250EK	England	Kanal 43—47 auf dem UHF-Band Englischer Standard

* Außer Frankreich

Hinweis:

- Das HF-Modulator-Modell KR-250EG/EK kann auf die Känale 43 bis 47 eingestellt werden. Stecken Sie dazu einen Schraubenzieher in das Loch Nr. 3 des HF-Modulators. Eine Drehung im Uhrzeigersinn erhöht die Frequenz, auf die der Modulator abgestimmt ist.

WIEDERHOLTE WIEDERGABE

Mit der folgenden Bedienung kann das ganze Band, vom Angang bis zum Ende, wiederholt werden.

1. Den AUTO MODE-Wahlschalter auf REPEAT stellen.
2. Zum Starten der Wiedergabe die PLAY-Taste drücken.

Wenn das Bandende erreicht wird, wird das Band automatisch zurückgespult und erneut wiedergegeben. Auf diese Weise kann das Band beliebig oft wiedergegeben werden.

RÜCKSPULEN UND BILDSUCHLAUF

- Die REW-Taste drücken. Das Band wird zurückgespult, und die Rückspul-LED-Anzeige leuchtet.

- Wenn die REW-Taste in der Stop-Betriebsart gedrückt wird, wird auf Rückspulen geschaltet. Wenn die REW-Taste bei der Wiedergabe oder in der Standbild-Betriebsart gedrückt wird, wird auf Rückwärts-Bildsuchlauf geschaltet.

SCHNELLVORLAUF UND BILDSUCHLAUF

- Die FF-Taste drücken. Das Band wird vorgespult, und die FF-LED-Anzeige leuchtet.
- Wenn die FF-Taste in der Stop-Betriebsart gedrückt wird, wird auf Schnellvorlauf geschaltet. Wenn die FF-Taste bei der Wiedergabe oder in der Standbild-Betriebsart gedrückt wird, wird auf Vorwärts-Bildsuchlauf geschaltet.

Hinweis:
Die Bildsuchlauf-Geschwindigkeit beträgt etwa das 15-fache der normalen Bandgeschwindigkeit. Wenn eine Fernbedienung (Sonderzubehör) verwendet wird, kann die Bildsuchlauf-Geschwindigkeit durch Drehen des Reglers der Fernbedienung stufenlos von Null bis zur 5-fachen Normalgeschwindigkeit eingestellt werden. Wenn dieser Regler ganz bis zum Anschlag gedreht wird, beträgt die Suchlauf-Geschwindigkeit das 15-fache der Normalgeschwindigkeit. Beim Suchlauf in beiden Richtungen kann das Bild wandern, wenn die Geschwindigkeit die 5-fache Normalgeschwindigkeit überschreitet.

ZÄHLWERK-SUCHLAUF

1. Das Zählwerk an der Bandstelle, von der ab das Band wiedergegeben werden soll, auf 00:00 zurückstellen.
2. Den AUTO MODE-Wahlschalter auf SEARCH stellen.
3. Zum Rückspulen oder Vorspulen des Bandes bis zu der Stelle, wo das Zählwerk zurückgestellt wurde, die REW- oder die FF-Taste drücken.
4. Wenn die Zählwerk-Position 00:00 erreicht wird, stoppt das Band automatisch, und das Gerät schaltet auf die Stop-Betriebsart.

Hinweis:
Das Band kann die Zählwerk-Position 00:00 manchmal um 3 bis 5 Sekunden überfahren.

AUTOMATISCHES RÜCKSPULEN

Wenn das Band bei Wiedergabe oder Aufnahme ganz abgelaufen ist, wird es automatisch zurückgespult, danach schaltet das Gerät auf die Bereitschafts-Betriebsart. Die Zählwerk-Suchlauf- und die Wiedergabe-Wiederholung-Funktion sind bei diesem automatischen Zurückspulen bedienbar.
Wenn das Band beim Schnellvorlauf ganz bis zum Ende gespult ist, schaltet das Gerät automatisch auf die Bereitschafts-Betriebsart.

AUFNAHME

BEDIENUNG FÜR AUFNAHME

1. Der VIDEO MODE-Wahlschalter sollte normalerweise auf AUTO stehen. Den Schalter bei der Aufnahme von Schwarz/Weiß-Signalen auf B/W stellen. Dann leuchtet die B/W-LED-Anzeige.
2. Stellen Sie den SYNC-Wahlschalter normalerweise auf VIDEO ein.
3. Stellen Sie den Eingangs-Wahlschalter (INPUT) nach Bedarf ein.

   Leitung (LINE): Wählen Sie diese Einstellung bei der Aufnahme von Video-Signalen vom Video-Eingangsanschluß (VIDEO IN) oder bei der Aufnahme von Audio-Signalen entweder von den Audio-Anschlüssen (AUDIO IN) oder von der Mikrofonbuchse (MIC).
   - Wenn ein Mikrofon angeschlossen wird, erfolgt die automatische Trennung des Eingangssignals von den Audio-Anschlüssen (AUDIO IN), und der Ton von der Mikrofonbuchse (MIC) wird aufgenommen.

   Fernseher (TV): Wählen Sie diese Einstellung, wenn Sie Signale von dem 8-poligen Fernsehanschluß (TV) aufnehmen wollen. Das Audiosignal wird auf die Tonspur des Kanals 2 aufgenommen.

   FM DUB: Für Kopf-zu-Kopf-Kopieren diese Position wählen. Für Einzelheiten zum Kopf-zu-Kopf-Kopieren siehe Seite 49.
4. Die PLAY- und die REC-Taste gleichzeitig drücken, um auf Aufnahme zu schalten. Durch Einstellung des VIDEO LEVEL-Reglers kann die Aufnahme mit einem optimalen Aufnahmepegel durchgeführt werden.
5. Zum Stoppen der Aufnahme die STOP-Taste drücken.

Hinweis:
Wenn in der Standbild-Betriebsart ganz am Bandanfang auf Aufnahme geschaltet wird, kann es vorkommen, daß das Band zurückgefahren wird und wieder in der Standbild-Betriebsart stoppt. In einem solchen Fall zuerst die PLAY-Taste drücken und dann auf Aufnahme schalten, oder die PLAY- und die REC-Taste zusammen für etwa 3 Sekunden gedrückt halten.

AUFNAHME MIT EXTERNER SYNCHRONISATION

Zur Aufnahme von Videosignalen in Synchronisation mit einem externen Sync-Signal wie folgt verfahren:

1. Das externe Sync-Signal an den SYNC IN-Anschluß anschließen.
2. Den SYNC-Wahlschalter auf EXT stellen.
3. Das aufzunehmende Videosignal an den VIDEO IN-Anschluß anschließen.
4. Den INPUT-Wahlschalter auf LINE stellen.
5. Zum Starten der Aufnahme die PLAY- und die REC-Taste gleichzeitig drücken.

- Wenn das Video-Eingangssignal nicht mit dem externen Sync-Signal phasensynchronisiert ist, erscheint auf dem Wiedergabebild von Aufnahmen, die nach dem oben beschriebenen Verfahren gemacht wurden, eine durch die Schaltpunkte der Videoköpfe verursachte Verzerrung.
- Extern synchronisierte Aufnahme ist auch während des Kopierens möglich. Sie müssen zu diesem Zweck das gleiche externe Sync-Signal in den Sync-Eingang (SYNC IN) des Wiedergabe- und Aufnahmegerätes speisen. Ferner muß der SYNC-Wahlschalter sowohl des Wiedergabegerätes als auch des Aufnahmegerätes auf Extern (EXT) eingestellt sein.

BAND-ZU-BAND-KOPIEREN

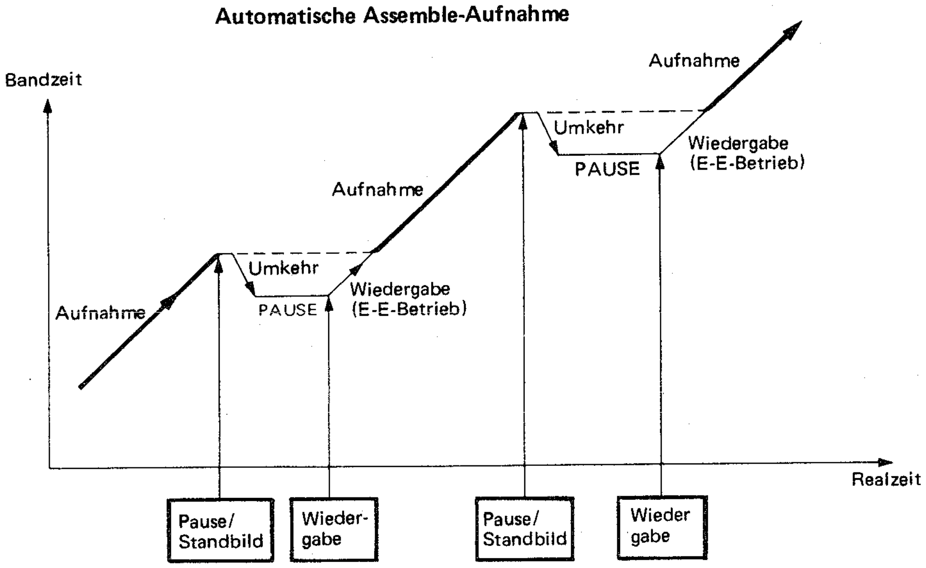
1. Den Zuspieler und den Rekorder nach den Anweisungen auf Seite 9 miteinander verbinden.
2. Wenn Sie das Wiedergabegerät unter Synchronisation mit einem externen Sync-Signal antreiben wollen, müssen Sie den SYNC-Wahlschalter des Wiedergabegerätes auf Extern (EXT) einstellen.
3. Stellen Sie den SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO ein.
4. Stellen Sie den Eingangs-Wahlschalter des Aufnahmegerätes nach Bedarf ein.
   Leitung (LINE):
      Wählen Sie diese Einstellung für eine Band-zu-Band-Kopie.
   Kopf-zu-Kopf-Kopie (FM DUB):
      Wählen Sie diese Einstellung für eine Kopf-zu-Kopf-Kopie.
   - Auch bei einer Kopf-zu-Kopf-Kopie muß der Video-Ausgang (VIDEO OUT) des Wiedergabegerätes mit dem Video-Eingang (VIDEO IN) des Aufnahmegerätes in der gleichen Weise wie bei einer Band-zu-Band-Kopie verbunden werden.
5. Schalten Sie das Wiedergabegerät auf Wiedergabebetrieb, und das Aufnahmegerät auf Aufnahmebetrieb.

PAUSE UND ASSEMBLE-AUFNAHME

Zum Unterbrechen der Aufnahme und Anhängen der folgenden Aufnahme unmittelbar an die vorige die PAUSE/STILL-Taste auf die folgende Weise verwenden. So werden die Aufnahmen sauber und ohne Verzerrungen zwischen den einzelnen Aufnahmesegmenten aneinandergefügt.

1. Drücken Sie während der Aufnahme die Pause/Standbild-Taste (PAUSE/STILL). Der Aufnahmebetrieb wird aufgehoben (wobei die Aufnahme-LED-Anzeige erleuchtet bleibt), und das Band stoppt im Pausenbetrieb, nachdem es automatisch um etwa 2 Sekunden Aufnahmezeit zurückgespult wurde. Wenn an dieser Stelle die PAUSE/STILL-Taste noch einmal gedrückt wird, kann das aufgenommene Bild auf dem Monitorschirm gesehen werden, aber manchmal nur in Schwarz/Weiß.
2. Zum Fortsetzen der Aufnahme die PLAY-Taste drücken. Zuerst wird auf die Wiedergabe-Betriebsart geschaltet (das Ausgangssignal ist jedoch nicht das Wiedergabesignal vom Band, sondern das Eingangssignal, das aufgenommen werden soll). Wenn die Wiedergabe den Punkt erreicht, wo die vorige Aufnahme mit der PAUSE/STILL-Taste gestoppt wurde (das dauert etwa 2 Sekunden), wird automatisch von Wiedergabe auf Aufnahme geschaltet.

Automatische Assemble-Aufnahme



KOPF-ZU-KOPF-KOPIEREN

Bei Video-Kassettenrekordern wird das Signal zuerst in ein frequenzmoduliertes Signal (FM-Signal) umgewandelt und dann auf das Band aufgenommen. Während der Wiedergabe wird dieses FM-Signal vom Band abgenommen und in das ursprüngliche Videosignal demoduliert. Wenn deshalb bestimmte Aufnahmen auf einem Band wiedergegeben und auf ein anderes Band neu aufgenommen werden (entweder für Kopieren oder Bildschnitt), geht folgender Prozess vor sich: Das Wiedergabegerät nimmt das FM-Signal vom Band ab, macht daraus durch Demodulation wieder das ursprüngliche Videosignal und übermittelt dieses Signal zum Aufnahmegerät. Dieses empfängt das Videosignal, wandelt es in das FM-Signal um und nimmt es auf das Band auf.

Beim Kopf-zu-Kopf-Kopieren überträgt das Wiedergabegerät das FM-Signal so, wie vom Band abgenommen, ohne Demodulierung, und das Aufnahmegerät nimmt das FM-Signal direkt auf das Band auf. Das bedeutet, daß bei dem Kopf-zu-Kopf-Kopieren keine Modulation und Demodulation stattfinden, so daß jede Bildverschlechterung, die durch diesen Prozeß bedingt ist, vermieden wird. Das Kopf-zu-Kopf-Kopieren ergibt daher bessere Kopien als die gewöhnliche Kopiermethode (Band-zu-Band-Kopieren).

Wesentlich ist sowohl für das Band-zu-Band-Kopieren wie auch für das Kopf-zu-Kopf-Kopieren, daß die Servovorrichtungen des Aufnahmegerätes mit dem aufzunehmenden Signal synchronisiert sind. Für diesen Zweck benützt das Band-zu-Band-Kopieren ein vertikales Sync-Signal, das vom Video-Eingangssignal als Referenzsignal für die Servovorrichtungen getrennt werden kann. Beim Kopf-zu-Kopf-Kopieren ist jedoch die Trennung des vertikalen Sync-Signals vom FM-Eingangssignal schwierig. Deshalb ist die Anwendung eines separaten Referenz-Sync-Signals notwendig. Für diesen Zweck können zwei verschiedene Methoden angewendet werden:

1. Speisen Sie das demodulierte Videosignal vom Wiedergabegerät (das Ausgangssignal am Videoausgang (VIDEO OUT) des Wiedergabegerätes) in den Videoeingang (VIDEO IN) des Aufnahmegerätes. In diesem Falle muß der SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO eingestellt sein.
2. Speisen Sie das gleiche externe Sync-Signal in den Sync-Eingang (SYNC IN) des Wiedergabe- und des Aufnahmegerätes. Der SYNC-Wahlschalter des Wiedergabe- und des Aufnahmegerätes muß in diesem Falle auf Extern (EXT) eingestellt sein.

Hinweis:

- Wenn der INPUT-Wahlschalter auf FM DUB steht, zeigt das VIDEO-Meßinstrument den Pegel des Eingangssignals, das an dem VIDEO IN-Anschluß anliegt.

NACHVERTONUNG

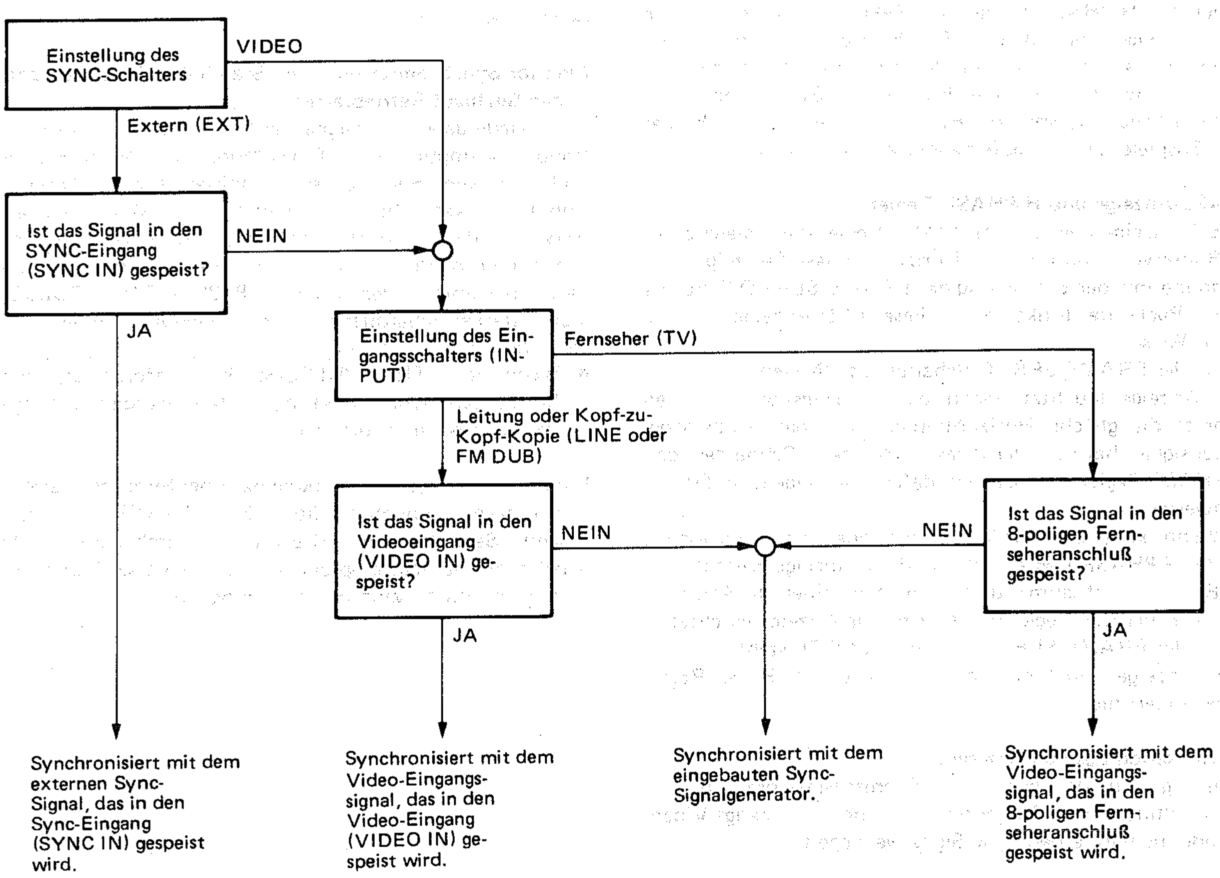
Mit der Nachvertonung-Funktion ist es möglich, bei der Wiedergabe des bereits aufgenommenen Bandes nur den Ton aufzunehmen. Der Ton von einer Quelle, die am CH-1 AUDIO IN-Anschluß oder am CH-1 MIC-Anschluß angeschlossen ist, kann auf den Tonkanal 1 aufgenommen werden.

1. Eine Tonquelle an den entsprechenden Anschluß anschließen.
2. Zum Starten der Nachvertonung die AUD-1 DUB- und die PLAY-Taste gleichzeitig drücken.
3. Zum Stoppen der Nachvertonung die STOP-Taste drücken.

- Die Pause-Funktion erleichtet die Nachvertonung. Zuerst das bereits aufgenommene Band wiedergeben und an der Stelle, an der die Nachvertonung beginnen soll, die PAUSE/STILL-Taste drücken. Dann die AUD-1 DUB- und die PLAY-Taste gleichzeitig drücken. Auf diese Weise kann die Nachvertonung genau an der richtigen Stelle beginnen.
- Durch Einstellen des AUDIO MONITOR-Wahlschalters kann sowohl der Ton, der aufgenommen wird, als auch der Ton auf dem Tonkanal 2 gehört werden, entweder durch die PHONES- oder durch die AUDIO MONITOR-Buchse.

REFERENZ-SYNC-SIGNALE FÜR AUFNAHME UND WIEDERGABE

Die Referenz-Sync-Signale für die Servovorrichtungen während der Aufnahme und Wiedergabe unterscheiden sich voneinander wie unten aufgezeigt, abhängig von der jeweiligen Einstellung des SYNC- und Eingang (INPUT)-Wahlschalters, sowie von den Bedingungen, unter denen die Signale in die Eingangsanschlüsse gespeist werden.


Einstellung des SYNC-Schalters
VIDEO
Extern (EXT)
Ist das Signal in den SYNC-Eingang (SYNC IN) gespeist?
NEIN
JA
Einstellung des Eingangsschalters (INPUT)
Fernseher (TV)
Leitung oder Kopf-zu-Kopf-Kopie (LINE oder FM DUB)
Ist das Signal in den Videoeingang (VIDEO IN) gespeist?
NEIN
JA
Ist das Signal in den 8-poligen Fernseheranschluß gespeist?
NEIN
JA
Synchronisiert mit dem externen Sync-Signal, das in den Sync-Eingang (SYNC IN) gespeist wird.
Synchronisiert mit dem Video-Eingangssignal, das in den Video-Eingang (VIDEO IN) gespeist wird.
Synchronisiert mit dem eingebauten Sync-Signalgenerator.
Synchronisiert mit dem Video-Eingangssignal, das in den 8-poligen Fernseheranschluß gespeist wird.

VORSICHTSMASSNAHMEN FÜR VERWENDUNG IN EINEM SCHNITT-SYSTEM

Einstellung der Horizontalphase

Zum Schneiden mit verbesserter Genauigkeit ist dieser Rekorder mit einem Horizontalphasen-Regler ausgestattet, mit dem die H-Phase des Rekorders präzise mit der H-Phase des Zuspielers abgestimmt werden kann.

1. Den H-PHASE-Regler des Zuspielers auf die mittlere Einrastposition einstellen.
2. Den Rekorder auf die Insertschnitt-Betriebsart schalten.
3. Die Insertschnitte wiederholt starten und stoppen und dabei den H-PHASE-Regler des Rekorders drehen, bis die LED-Anzeige über dem H-PHASE-Regler leuchtet. Dies kann auch auf dem Monitorschirm (interner Sync-Monitor) überprüft werden, wo das horizontale Sync-Signal nicht mehr sichtbar ist, wenn die Horizontalphasen von Rekorder und Zuspieler perfekt aufeinander abgestimmt sind.

H-PHASE-Anzeige und H-PHASE-Regler

Die LED-Anzeige über dem H-PHASE-Regler dient gleichzeitig als Bildservo- und als Horizontalphasen-Anzeige. In Verbindung mit der Einstellung des FRAME SERVO-Schalters auf der Rückseite funktioniert diese LED-Anzeige auf die folgende Weise:

1. Wenn der FRAME SERVO-Schalter auf ON steht
   Die Anzeige leuchtet, wenn das Eingangssignal für den Schnitt die gleiche Horizontalphase wie das Wiedergabe-Videosignal hat. In der Praxis vor dem Schneiden den H-PHASE-Regler so einstellen, daß die Anzeige leuchtet.
   Hinweise:
   - Wenn kein Eingangssignal vorhanden ist, funktioniert der H-PHASE-Regler nicht, und die Anzeige erlischt.
   - Bei der Aufnahme und beim Schneiden funktioniert der H-PHASE-Regler nicht, wenn die Anzeige leuchtet.
2. Wenn der FRAME SERVO-Schalter auf OFF steht
   Die Anzeige leuchtet nicht, und der H-PHASE-Regler funktioniert nicht.

Synchronisation des Schnittservos

Unabhängig von der gewählten Schnitt-Betriebsart ist der Servo-Schaltkreis des Rekorders mit dem Eingangs-Videosignal oder dem externen Sync-Signal verriegelt.

Wurde der SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO gestellt, so wird dessen Servoschaltung von den Wiedergabebedingungen des Wiedergabegerätes beeinflusst. Sollte z.B. das Wiedergabegerät auf Standbild oder Suchlauf eingestellt sein, so könnte das Wiedergabebild des Aufnahmegerätes (bei Betriebsart Wiedergabe) asynchron werden.

Um ein stabiles Wiedergabebild des Aufnahmegerätes zu erhalten, empfiehlt es sich, das Wiedergabegerät auf Stop oder Wiedergabe (wenn das Band auf dem Wiedergabegerät normale Aufnahmen enthält) einzustellen oder benutzen Sie ein externes Synchronsignal, indem Sie den SYNC-Wahlschalter auf EXT stellen.

Das Referenz-Sync-Signal für die Servo-Systeme bei Aufnahme und Wiedergabe ist unterschiedlich, abhängig von der Einstellung des SYNC- und des INPUT-Wahlschalters, siehe Abbildung auf Seite 50, und abhängig von dem Signal, das an den Eingangsbuchsen anliegt.

FRAME SERVO-Schalter

Wenn beim Band-zu-Band-Kopieren Bänder mit einem schlechten Wiedergabebild-Störspannungsabstand verwendet werden, können bei Kopien von mehr als drei Generationen und bei Bändern, die mit Cameras mit ungeeigneten Zeilensprung-Standards aufgenommen oder mit Schnitt-Geräten anderer Hersteller geschnitten wurden, an den Schnittpunkten Bildverzerrungen auftreten. Dies beruht auf einer Fehlfunktion des Bildservos. Um dies zu vermeiden, den FRAME SERVO-Schalter auf OFF stellen.

Monitor-Synchronisation in der Standbild-Betriebsart und in den Suchlauf-Betriebsarten

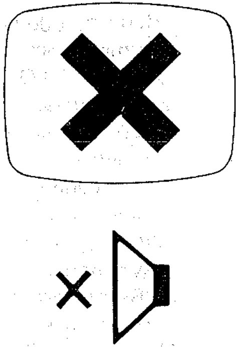
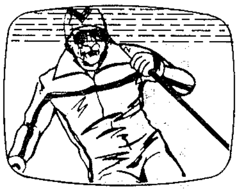
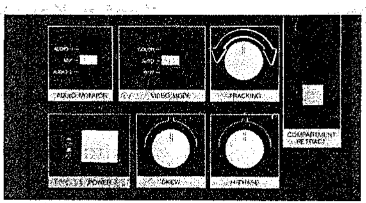
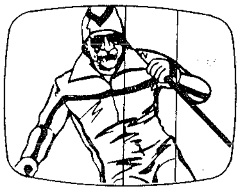
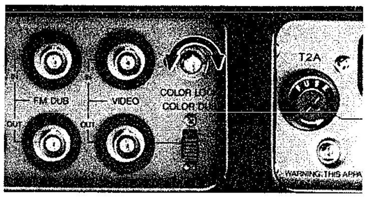
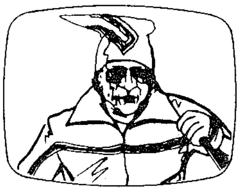
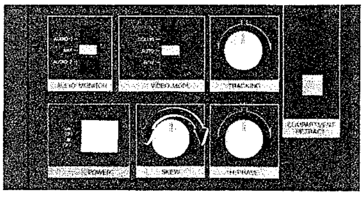
Das Wiedergabe-Videosignal enthält einen vertikalen Sync-Impuls (V-Impuls), so daß das Monitorbild auch beim Standbild und beim Suchlauf synchronisiert bleibt. Wegen dieses Impulses kann bei Verwendung von Monitoren anderer Hersteller die horizontale Synchronisation teilweise verloren gehen (der obere Teil des Bildes kann verzerrt sein). Wenn dies vorkommt, den Stecker P129 (STILL PULSE) der Vorverstärker-Schaltplatte ziehen. (Wenden Sie sich für Einzelheiten an einen JVC-Händler.)

- Wenn der STILL PULSE-Stecker entfernt ist, kann die horizontale Synchronisation unstabil werden, abhängig von der Position der Störzeilen.

Wir empfehlen die Verwendung externer Synchronisation

Die externe Synchronisation (EXT SYNC) stabilisiert das gesamte Servo-System und erzeugt dadurch stabilere Wiedergabebilder. Deshalb empfehlen wird die Verwendung externer Synchronisation, wann immer es möglich ist.

STÖRUNGSSUCHE

Symptome	Prüfstellen	Anmerkungen
Kein Bild, kein Ton. 	Nachprüfen, ob der VTR/TV-Schalter des Fernsehmonitors auf VTR eingestellt ist. Wenn nicht, auf VTR stellen.	Beziehen Sie sich für weitere Einzelheiten auf die Bedienungsanleitung des Fernsehmonitors.
Störbalken oder verschmiertes Bild. 	Prüfen Sie nach, ob der Spurlagenregler (TRACKING) aus der Mitte geraten ist. Drehen Sie den Spurlagenregler (TRACKING) langsam, bis Sie ein klares Bild erhalten. 	Drehen Sie diesen Regler nach dem Abspielen des betreffenden Bandes wieder auf die Rast-Mittelstellung zurück.
Monochromes Bild, falscher Farbton oder Farbstreifen. 	Drehen Sie langsam den Farbsperr-Regler (COLOR LOCK), bis Sie die korrekte Farbe erhalten. 	Abstimmung von Farbe, Farbton, Helligkeit und Kontrast kann mit diesem Regler nicht durchgeführt werden. Drehen Sie diesen Regler nach dem Abspielen des betreffenden Bandes wieder auf die Rast-Mittelstellung zurück.
Bildschräge – der obere Teil des Bildes verzieht sich horizontal. 	Beheben Sie diese Störung durch Betätigen des Entzerr-Reglers (SKEW). Drehen Sie zuerst den Vertikal-Bildfangregler des Fernsehgerätes so, daß die Rahmenlinie (entsprechend der Austastperiode) zu sehen ist. Drehen Sie dann den Entzerr-Regler langsam in beiden Richtungen, bis die leichte Biegung dieser Rahmenlinie korrigiert ist. 	Drehen Sie den Entzerr-Regler (SKEW) nicht während einer Aufnahme. Drehen Sie diesen Regler nach dem Abspielen des betreffenden Bandes wieder auf die Rast-Mittelstellung zurück.

TECHNISCHE DATEN

ALLGEMEIN

Spannungsversorgung : 110/127/220/240 V∿, ±10 % 50/60 Hz, 120 W (max. 130 W mit der Schnittsteuereinheit RM-88U)
Abmessungen : 56,4(B) x 22,1(H) x 47,1(T)cm
Gewicht : 30,6 kg
Betriebstemperatur : 5°C bis 40°C
Betriebslage : Nur horizontal
Bandgeschwindigkeit : 9,53 cm/sek.
Aufnahmezeit : Max. 60 Minuten mit JVC KCA-60
Schnellvorlauf/Rückspul-Zeit : Innerhalb von 4 Minuten 30 Sekunden für 60-Minuten-Band
Gleichlaufschwankungen : Weniger als 0,15 % RMS

VIDEO

Aufnahmesystem : Rotierendes Zweikopfsystem mit Schrägspurabtastung
  Leuchtdichte : FM-Aufnahme
  Farbsignal : Direktaufnahme durch umgesetzten Hilfsträger
Videosignalsystem : PAL-Farbsignal, 625 Zeilen (CCIR-Standard)
Eingänge Line/TV : 0,5 – 2,0 Vs-s, 75 Ohm
  Kopf-zu-Kopf-Kopieren : 0,5 Vs-s, 75 Ohm
Ausgänge Line/TV : 1,0 Vs-s, 75 Ohm
  Kopf-zu-Kopf-Kopieren : 0,5 Vs-s, 75 Ohm
Störspannungsabstand : Mehr als 46 dB (Farbe), mehr als 48 dB (schwarz/weiß) (Rohde & Schwarz Störspannungsmesser)
Horizontale Auflösung : Monochrom 330 Zeilen, Farbe 250 Zeilen
Hilfsträger-Eingang : 2,0 Vs-s, 75 Ohm
Sync-Eingang : 0,5 bis 4,0 Vs-s, 75 Ohm
Eingangswahl : TV/LINE/FM DUB
Videobetriebsart-Wahl : COLOR/AUTO/BW
Sync-Wahl : EXT/VIDEO (INT)

AUDIO

HF-Ausgang : Antennenanschluß
Eingänge Line : –20/0 dBs, 10 kOhm, symmetrisch
  Mikrofon : –70 dBm, 600 Ohm, unsymmetrisch
  TV : –20 dBs, 10 kOhm, unsymmetrisch
Ausgänge Line : –20/0 dBs, niederohmig, symmetrisch
  Monitor : 0 dBs, niederohmig, symmetrisch
  Kopfhörer : –28 dBs, 8 Ohm, unsymmetrisch
  TV : 0 dBs, niederohmig, unsymmetrisch
Störspannungsabstand : Mehr als 48 dB (bei 3 % Klirrfaktor)
Frequenzgang : 50 bis 15.000 Hz
Eingangswahl : TV/LINE/MIC
Monitor-Ausgangswahl : CH-1/MIX/CH-2

ANSCHLÜSSE

Video-Eingang/Ausgang : BNC
Kopf-zu-Kopf-Kopieren-Eingang/Ausgang : BNC
Sync/Hilfsträger-Eingang : BNC
Audio Line-Eingang/Ausgang : XLR
Mikrofon : 6-mm-Buchse
Monitor-Ausgang : XLR
Kopfhörer : 6-mm-Klinke
TV-Eingang/Ausgang : EIAJ 8-pol. TV-Anschluß
Netzeingang : 3-adriger Anschluß
Fernbedienung : 45-pol. Anschluß

ZUBEHÖR : Monitorkabel
Schutzhaube

Technische Änderungen vorbehalten.

CP-5550E

INSTRUCTIONS
MANUEL D'INSTRUCTIONS
BEDIENUNGSANLEITUNG

For reference, the text of the instruction booklet of this model is reproduced in the following pages.
Numbering of the pages also corresponds with that of the booklet.

CP-5550E
COLOUR VIDEO CASSETTE PLAYER

WARNING—THIS APPARATUS MUST BE EARTHED
IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-and-YELLOW:	EARTH
BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE msut be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

POWER SYSTEM

Connection to the mains supply

The operating voltage of this set is preset to 240 V∿ at the factory.

Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting to local power line

This set operates on either 110, 127, 220 or 240 V∿.

If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector and turning it until the correct voltage is displayed.

CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

Warning Notice

FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core correctly wired.

FOR YOUR SAFETY

Install any external aerial to AS 1417.1

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PRECAUTIONS

Handling and storage

- Avoid using the CP-5550E under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibration, and
  - poorly ventilated places.
- Be careful about moisture condensation.
  Avoid using the CP-5550E soon after moving from a cold place to a warm place or soon after heating a room which was cold. Water vapor in the warm air will condense on the still-cold video head drum and tape guides and this moisture may cause damage to the tape and the player.
- Handle the CP-5550E carefully.
  - Do not place the provided dust cover on the player while it is being used.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the player.
  - Do not place anything which might spill and cause internal damage on top of the player.
  - Use in horizontal position only.
- In case of transportation,
  - Avoid violent shocks to the player during packing and transportation.
  - Before packing, be sure to remove the cassette from the player.

Video cassettes

- Use KCA series 3/4" U-standard video cassettes. However, the smaller KCS-20 cassettes can also be used with this player. To insert the KCS-20 cassette into this player, match the cassette's guide groove with the guide ridge on the cassette holder.

FEATURES

Direct-drive head drum and capstan motors
The head drum and capstan are driven by brushless direct-drive DC motors for excellent stability and durability.

Aluminium diecast chassis for high reliability and durability
The high reliability and high durability of the tape control mechanism are assured by the aluminium diecast chassis, the two-motor gear-driven tape loading system and the power-elevated cassette eject mechanism.

Reel servo system with independent reel motors
The stability of tape transport is enhanced by independent supply and take-up reel motors and the reel servo system which keeps tape tension constant not only during playback but also during fast forward and rewind, so that there is no overload on the tape at low or high speed.

FM-FM dubbing for improved copies
The FM-FM dubbing system in which the signals are transferred in the form of FM signals reduces degradation of picture quality, making the CP-5550E ideal for use as a master player for video software production and in copying/editing.

Professional standard connectors
BNC connectors are used for the output of video signals and 3-pin balanced XLR connectors are used for the output of audio signals.

H-Phase control
So that the CP-5550E can be synchronized precisely with the horizontal phase of the other equipment for more accurate editing, it is provided with a horizontal phase control.

Tracking meter
So that tracking can be adjusted accurately, the CP-5550E is equipped with an independent tracking meter.

Variable-speed dial search control
The playback speed can be varied continuously from zero (still) to 5 times normal speed in both the forward and reverse directions using the rotary dial on the optional editing control unit.

Microprocessor-based logic control
The logic control system using a microprocessor permits direct changeover between modes; it is not necessary to press the STOP button first. This facility also makes possible full remote control over all operation modes.

Capstan servo system for external lock
The capstan servo system permits playback to be locked to external sync signals. The external subcarrier input terminal also enables connection of a time base corrector (TBC).

Electronic real-time tape counter
The tape counter is electronically controlled and employs fluorescent tubes for a clear, easy-to-read display. Displaying elapsed time up to 59 min 59 sec, it facilitates the indexing of tapes.

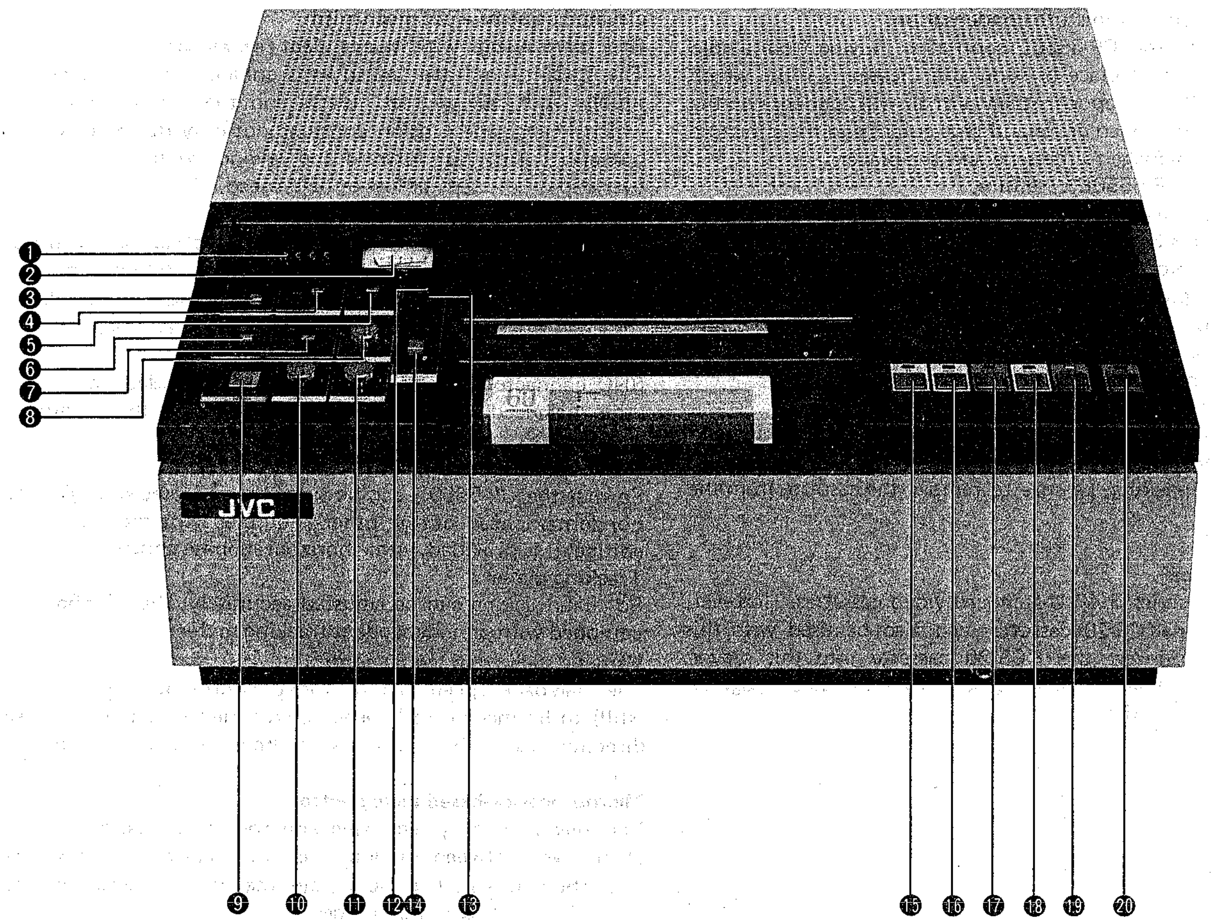
Automatic search mechanism
This permits the automatic location of any particular section of tape when used together with the tape counter.

Automatic repeat mechanism
When the Auto Repeat mode is selected, the tape is automatically rewound to the beginning from which point it is played back again.

Standby mode incorporated for more convenient operation
When the STOP button is pressed from any mode, the Standby mode is engaged and, since the tape remains loaded around the head drum during standby, the Play mode can be entered immediately.

CONTROLS AND CONNECTORS

CONTROL PANEL



① **Tape counter**
This 4-digit real-time tape counter shows the amount of tape that has run up to 59 min 59 sec.

② **TRACKING meter**
When adjusting tracking, turn the TRACKING control ⑧ so that the needle of this meter makes its maximum deflection.

③ **COUNTER RESET button**
To reset the tape counter to "00:00".

④ **AUTO MODE switch**
This switch selects automatic operations specifically related to rewinding.

SEARCH:	The tape stops automatically when it is rewound to the point corresponding to the counter reading of "00:00" and the unit enters the Stop mode.
OFF:	No automatic operation.
REPEAT:	When the tape is rewound to its beginning, it stops and then is reloaded automatically to repeat playback.

⑤ **SYNC select switch**
For selecting between different reference sync signals for the servo systems.

⑥ **AUDIO MONITOR select switch**
This switch selects the audio output available from the 8-pin TV connector, headphone jack or AUDIO MONITOR connector.

AUDIO-1:	To hear channel-1 audio.
MIX:	To hear a mixture of channel-1 and channel-2 audio.
AUDIO-2:	To hear channel-2 audio.

⑦ **VIDEO MODE select switch**
Select one of the three positions according to the playback signal.

COLOR: Set to this position when the playback video signal is a colour signal.

AUTO: The circuit is automatically switched between colour and black/white, allowing optimum playback. When this position is used with black/white signals, a higher picture resolution can be obtained. Normally set this switch at this position.

B/W: Set to this position when the playback signal is a monochrome signal. Higher picture resolution will be obtained.

- An LED indicator is provided to prevent the output of colour signals in black and white by mistake. This LED lights when the switch is set to B/W.

⑧ **TRACKING control**
To remove noise bars during playback, turn this control so that the TRACKING meter ② makes its maximum deflection.

⑨ **POWER switch**
Press to turn the power on. The level meters and the counter display will be illuminated. Pressing again will switch the power off.

⑩ **SKEW control**
Turn this control to correct the playback picture if the upper part is bent horizontally.

⑪ **H-PHASE control**
Use to align the horizontal phase of the CP-5550E to that of other equipment. Normally set this control to its centre click position and adjust H-phase with the recorder's control when editing. When the recorder and player become in phase, the LED indicator lights.

⑫ **WARNING indicator**
This LED lights in the following cases, and all operations are brought to a halt;

1) When the tape transport does not function properly and no tape is supplied or taken up,
2) When the tape-end detection lamp is disconnected,
3) When the drum motor stops, and
4) When the condensation sensor operates.
   - When this LED lights, immediately switch off the power.

⑬ **SERVO LOCK indicator**
Lights when the servo system is locked for normal operation.

⑭ **COMPARTMENT RETRACT lever**
Push back to lower the empty cassette compartment. When the player is not in use, the cassette compartment should be in the retracted position.

- Use this lever only to retract the empty cassette compartment, not for inserting a cassette.

Fast forward button (FF)
This functions in two ways; for fast forward and forward search. This button can be pressed from any mode; when it is pressed in the Play mode, the forward search is engaged with the tape running at about 15 times normal speed. In either case, fast forward or search, the FF indicator will light. To release the FF or Search mode, press any button except EJECT corresponding to the mode you wish to enter next.

⑯ **Rewind button (REW)**
This functions in two ways; for rewind and reverse search. This button can be pressed from any mode; when it is pressed in the Play mode, the reverse search is engaged with the tape running at about 15 times normal speed. In either case, rewind or reverse search, the REW indicator will light. To release the REW or Search mode, press any button except EJECT corresponding to the mode you wish to enter next.

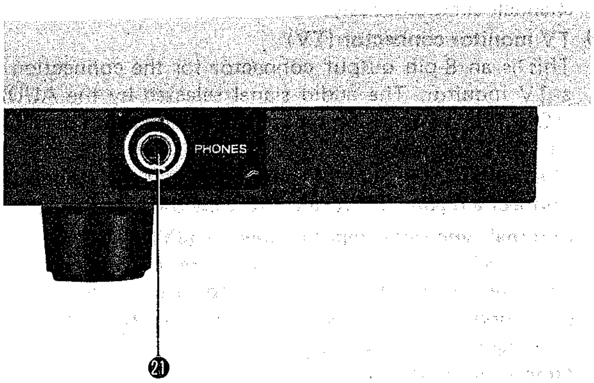
⑰ **PLAY button**
Press to start playback. The PLAY indicator will light. The PLAY button can be pressed directly from the FF or REW mode without pressing the STOP button.

⑱ **STILL button**
Press to stop the tape temporarily. To release the Still mode, press any button except EJECT corresponding to the mode you wish to enter next. If the STOP button is pressed from any mode other than Standby, the STILL and STOP indicators will light and the player will enter the Standby mode.

⑲ **STOP button**
When a cassette is inserted, the tape is partially loaded automatically and stopped (this state is referred to as the Stop mode). The STOP indicator remains lighted.
Press the STOP button once to engage the Standby mode from any other mode. To enter the Stop mode, press the STOP button once again.

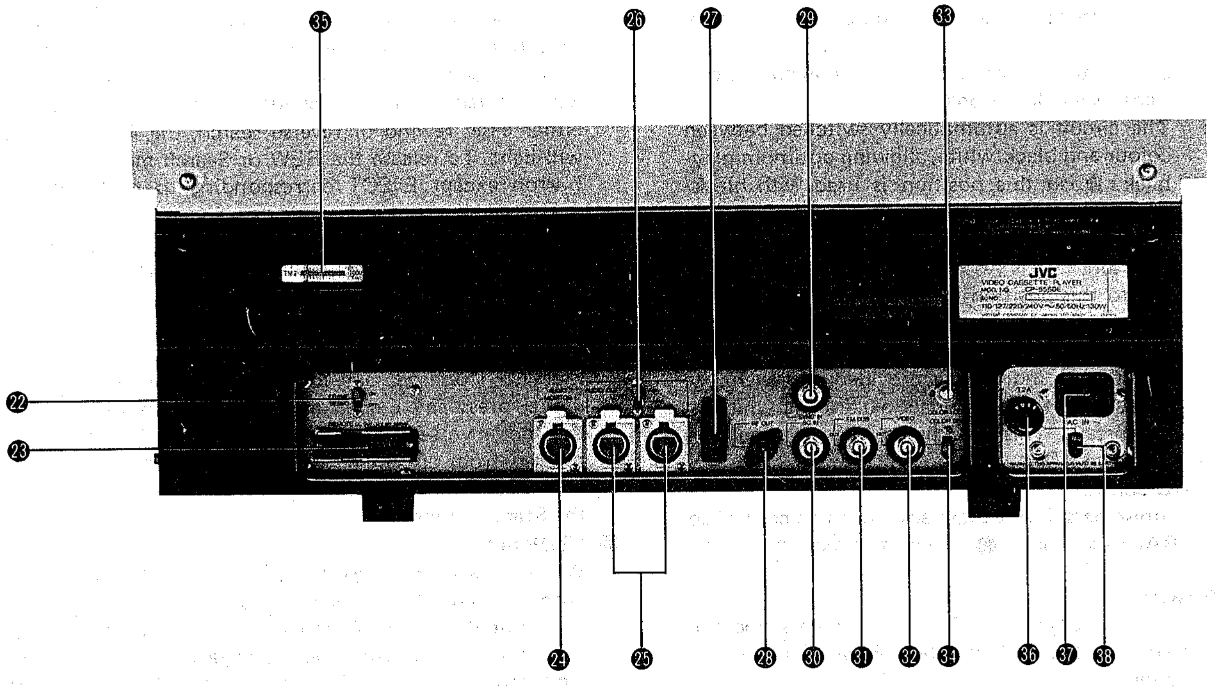
⑳ **EJECT button**
Press to eject the cassette. Ejection of the cassette can only be done from the Stop or Standby mode. When the EJECT button is pressed after the STOP button has been pressed, the LED indicator above the EJECT button will start flashing. After the completion of tape unloading, the cassette is automatically ejected.

FRONT PANEL



㉑ **Headphone jack (PHONES)**
Connect a set of headphones having an impedance of 8 ohms. The audio channel selected by the AUDIO MONITOR select switch ⑥ can be heard.

REAR PANEL



㉒ **FRAME SERVO switch**
Normally set this switch to ON. However, when tapes containing random interlaced or low S/N video signals are used, set it to OFF.

㉓ **REMOTE control connector**
Connect a JVC remote control unit.

㉔ **AUDIO MONITOR output connector**
The audio signal selected by the AUDIO MONITOR switch is present at this connector.

㉕ **Audio line output connectors (AUDIO OUT CH-1, CH-2)**
Output connectors for audio channel-1 and channel-2.

㉖ **Audio output level select switch (AUDIO OUT LEVEL)**
Select either 0 dB or -20 dB according to the level of the audio output signal. The level is switched for both audio channels simultaneously.

㉗ **TV monitor connector (TV)**
This is an 8-pin output connector for the connection of a TV monitor. The audio signal selected by the AUDIO MONITOR switch is present at the audio output terminal.

㉘ **RF OUT connector**
The output RF signal is available from this connector. Connect a regular TV receiver to view the video tape.

㉙ **External sync signal input connector (SYNC IN)**
This input connector accepts an external reference sync signal when the player is to be operated in the external sync mode. The external sync signal can be a composite sync signal or a composite video signal.

㉚ **Subcarrier input connector (SC IN)**
Input connector to accept external subcarrier signals such as from a time base corrector (TBC).

㉛ **FM dubbing connector (FM DUB OUT)**
FM dubbing connector for OUT.

㉜ **Video line connector (VIDEO OUT)**
Line output connector for video signal.

㉝ **COLOR LOCK control**
Turn to correct playback pictures if they lose colour or if there are erratic changes in colour.

㉞ **COLOR DUB switch**
When dubbing a tape recorded in colour to a recorder, set this switch to ON. This will improve the colour quality of the dubbed tape.

㉟ **Hour meter**
This indicates the total operating time. After 1,000 hours of operation, the red line moves to the right end of the scale.

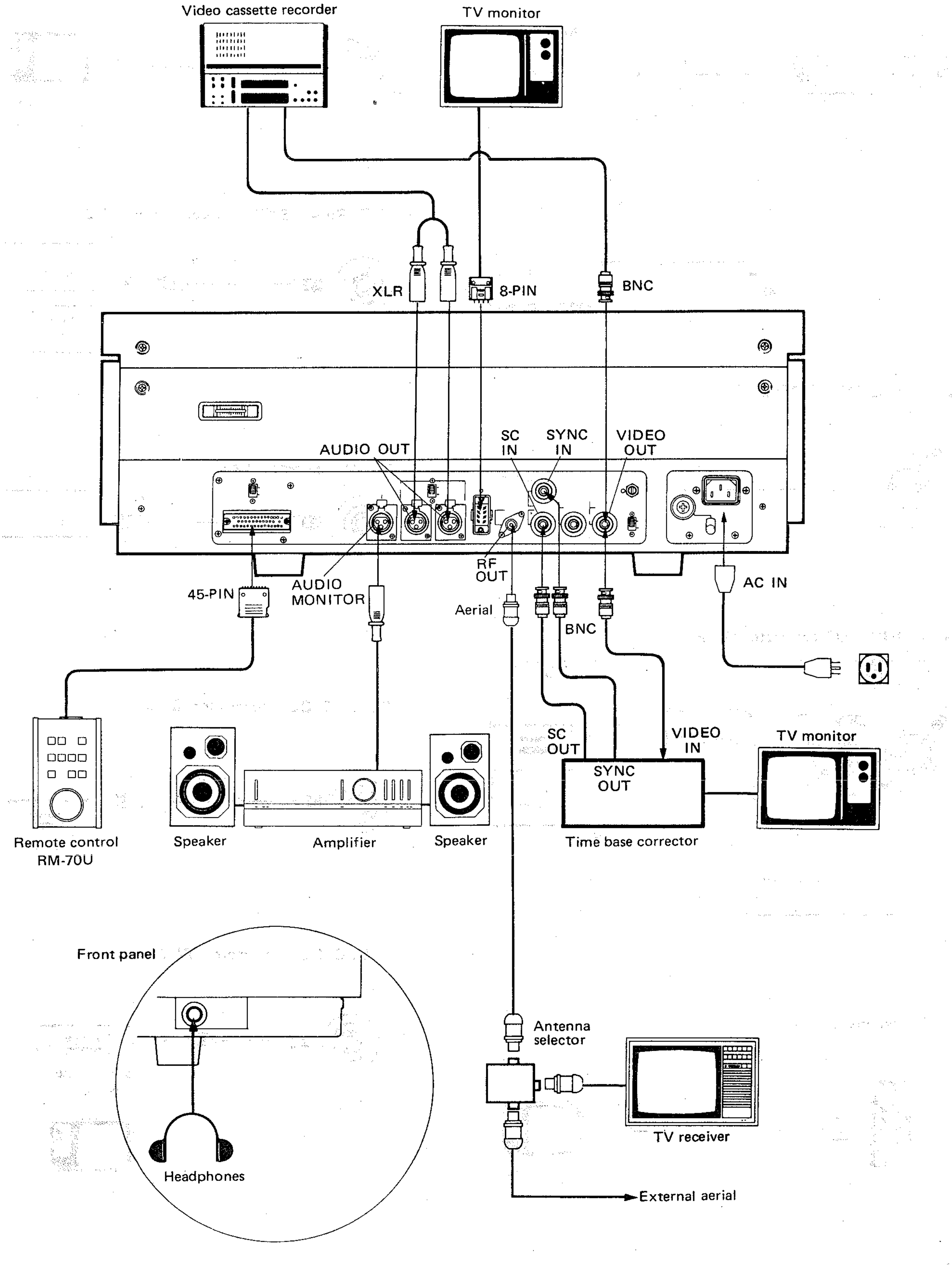
㊱ **Fuse**

㊲ **AC input socket (AC IN)**

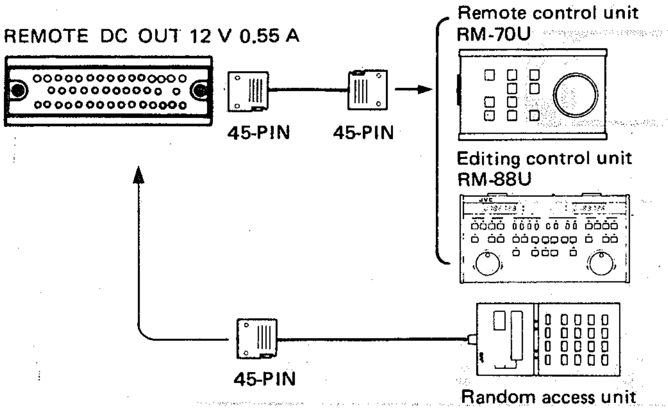
㊳ **AC voltage selector**
Set to the power supply voltage in your area.
This set operates on either 110, 127, 220 or 240 V∿.

CONNECTIONS

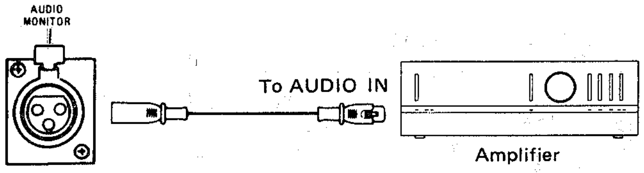
VIDEO AND AUDIO EQUIPMENT CONNECTIONS


Video cassette recorder
TV monitor
XLR
8-PIN
BNC
AUDIO OUT
SC IN
SYNC IN
VIDEO OUT
RF OUT
45-PIN
AUDIO MONITOR
Aerial
BNC
AC IN
SC OUT
VIDEO IN
SYNC OUT
TV monitor
Remote control RM-70U
Speaker
Amplifier
Speaker
Time base corrector
Front panel
Headphones
Antenna selector
TV receiver
External aerial

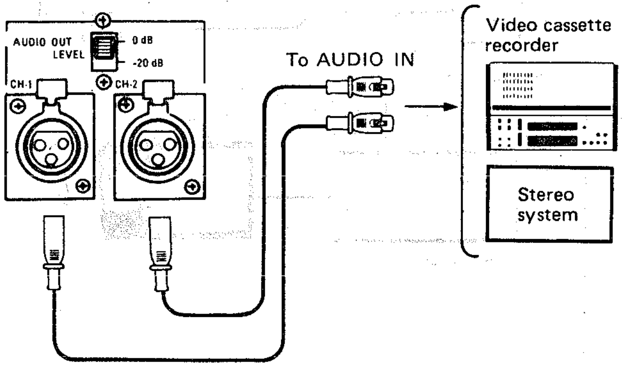
1. REMOTE control connector (45-PIN)


REMOTE DC OUT 12 V 0.55 A
45-PIN
45-PIN
Remote control unit
RM-70U
Editing control unit
RM-88U
45-PIN
Random access unit

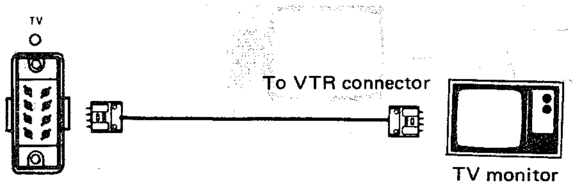
2. AUDIO MONITOR (XLR)


AUDIO
MONITOR
To AUDIO IN
Amplifier

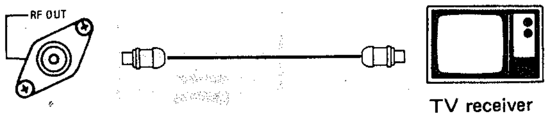
3. AUDIO OUT connector (XLR)


AUDIO OUT
LEVEL
0 dB
-20 dB
CH-1
CH-2
To AUDIO IN
Video cassette
recorder
Stereo
system

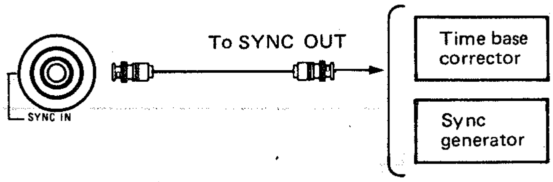
4. TV connector (8-PIN)


TV
To VTR connector
TV monitor

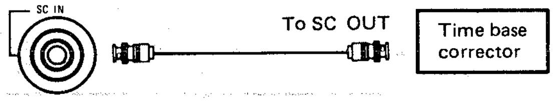
5. RF OUT connector


RF OUT
TV receiver

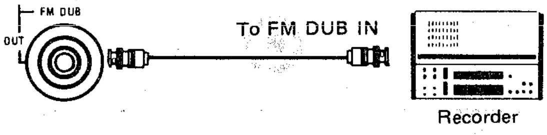
6. EXTERNAL SYNC IN connector (BNC)


SYNC IN
To SYNC OUT
Time base
corrector
Sync
generator

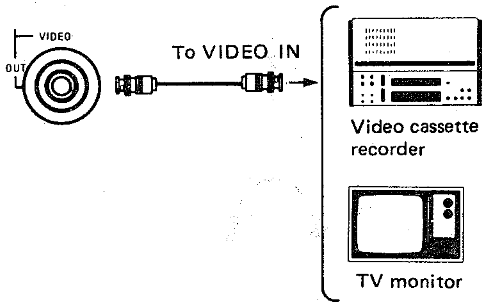
7. SC IN connector (BNC)


SC IN
To SC OUT
Time base
corrector

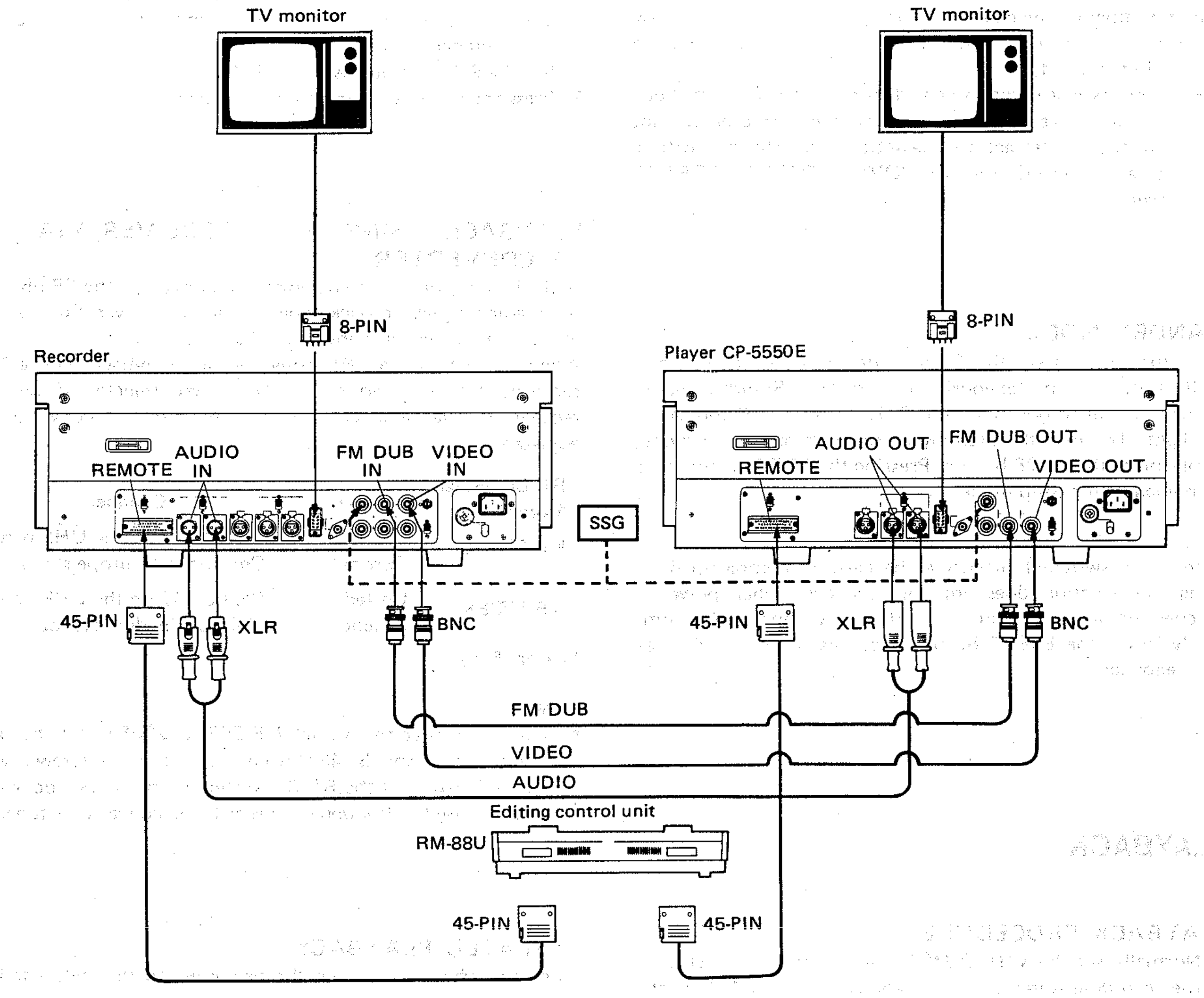
8. FM DUB OUT connector (BNC)


FM DUB
OUT
To FM DUB IN
Recorder

9. VIDEO OUT connector (BNC)


VIDEO
OUT
To VIDEO IN
Video cassette
recorder
TV monitor

EDITING CONNECTIONS



TV monitor
TV monitor
8-PIN
8-PIN
Recorder
Player CP-5550E
REMOTE
AUDIO IN
FM DUB IN
VIDEO IN
REMOTE
AUDIO OUT
FM DUB OUT
VIDEO OUT
SSG
45-PIN
XLR
BNC
45-PIN
XLR
BNC
FM DUB
VIDEO
AUDIO
Editing control unit
RM-88U
45-PIN
45-PIN

INSERTING A VIDEO CASSETTE

1. Press the POWER button to ON.
2. Press the EJECT button: the cassette compartment will lift automatically.
3. Insert the video cassette fully and correctly into the cassette compartment. The cassette compartment will automatically retract and the unit enters the Stop mode with the Stop LED indicator lit.
   - If the cassette compartment does not retract automatically, make sure the cassette is inserted correctly. Do not attempt to retract the cassette compartment (with a cassette inserted) using the COMPARTMENT RETRACT lever.

STANDBY MODE

After the unit enters the Stop mode, press the STILL and STOP buttons simultaneously to enter the Standby mode. In the Standby mode both the STILL and STOP indicators will light. To enter the Standby mode from any other mode, simply press the STOP button. Pressing the STOP button once again engages the Stop mode.

Note:

If power is switched off while the cassette compartment is lifting, the ejection does not continue even when power is switched on again. In order to lift the compartment completely, press the EJECT button once again after power has been reapplied.

PLAYBACK

PLAYBACK PROCEDURE

- Normally set the VIDEO MODE select switch to AUTO. If the recording is monochrome, you can set it to B/W. In this case, the B/W LED indicator will light.

1. Press the PLAY button. The Play LED indicator will light and playback starts.
2. Adjust the TRACKING and SKEW controls to optimize the playback picture.
   - If the playback picture colour is abnormal, correct it using the COLOR LOCK control on the rear panel.
3. If you wish to view a still picture, press the STILL button during playback. To release the Still mode, press the PLAY button.
   - When the tape reaches its end, it enters the Rewind mode.

Note:

When the Play mode is entered from the Stop mode, the picture may roll and no colour may appear in the first 1 or 2 seconds. To avoid this happening, start playback from the Standby mode.

EXTERNAL-LOCK PLAYBACK

When playback is to be locked to an external sync signal, proceed as follows:

1. Apply a reference sync signal to the SYNC IN connector. Use a composite sync signal or a composite video signal as the reference signal.
2. Set the SYNC select switch to EXT.
3. Press the PLAY button to start playback.

PLAYBACK USING A TV RECEIVER VIA AN RF CONVERTER

With the adoption of an optional RF converter, the CP-5550E is capable of playing back tape with a TV receiver. For installing the RF converter, consult your JVC dealer.

When you employ an RF converter for playback with a TV receiver, it is necessary to set the channel selector of the TV receiver to the same channel to which the RF converter is adjusted.

RF Converter Model	Area	Channel
KR-250EG	Continental Europe*	CH 43–47 on the UHF band Continental Europe standard
KR-250EK	United Kingdom	CH 43–47 on the UHF band United Kingdom standard

* Except France

Note:

- The RF Converter Model KR-250EG/250EK can be adjusted for channels 43 through 47. Insert a screwdriver into hole No. 3 of the RF Converter. Turning this clockwise will increase the frequency to which the converter is tuned.

REPEATED PLAYBACK

When the whole tape, from the beginning to the end, is to be repeated, proceed as follows:

1. Set the AUTO MODE select switch to REPEAT.
2. Press the PLAY button to start playback.

When the tape reaches its end, it is rewound to the beginning and then it is played back automatically. This procedure can be repeated as many times as desired.

REWINDING AND SHUTTLE SEARCH

- Press the REW button. The Rewind mode is entered and the Rewind LED indicator lights.
- When the REW button is pressed in the Stop mode, the Rewind mode is entered. When the REW button is pressed in the Play or Still mode, the Reverse Search mode is entered.

FAST FORWARDING AND SHUTTLE SEARCH

- Press the FF button. The Fast Forward mode is entered and the FF LED indicator lights.
- When the FF button is pressed in the Stop mode, the Fast Forward mode is entered. When the FF button is pressed in the Play or Still mode, the Forward Search mode is entered.

Note:
The search speed is about 15 times the normal tape speed. When an optional remote control unit is used, the search speed can be varied continuously from zero to 5 times normal speed by turning the remote control unit's search dial and the Search mode, at 15 times normal speed, can be attained when the search dial is fully turned in the direction of increasing speeds. The picture may roll during search in either direction if the speed exceeds 5 times normal.

COUNTER SEARCH

1. Reset the tape counter to "00:00" at the point from which you wish to play back again.
2. Set the AUTO MODE select switch to SEARCH.
3. When you wish to rewind or fast forward the tape to the point where the counter was reset, press the REW or FF button.
4. When the counter reading of "00:00" is reached, the tape stops automatically and the Standby mode is entered.

Note:
The tape may sometimes run over "00:00" for 3 to 5 seconds.

AUTOMATIC REWINDING

When the tape is fully wound to the end in the Play mode, it is automatically rewound to the beginning and enters the Standby mode. The counter search and repeated playback functions are operative also during this automatic rewinding. When the tape is fully wound to the end in the Fast Forward mode, the Standby mode is entered automatically.

TAPE DUBBING

1. Connect the player and the recorder with each other according to instructions on page 8.
2. If you wish to drive the player locked to an external sync signal, set the SYNC select switch of the player to EXT.
3. Set the SYNC select switch of the recorder to VIDEO.
4. Set the INPUT select switch of the recorder as required.
   LINE: Set to this position for VIDEO-VIDEO dubbing.
   FM DUB: Set to this position for FM-FM dubbing.
   - Even when FM-FM dubbing is to be performed, be sure to connect the VIDEO OUT connector of the player to the VIDEO IN connector of the recorder in the same way as for VIDEO-VIDEO dubbing.
5. Put the player in the Play mode and the recorder in the Record mode.

FM-FM DUBBING

With video cassette recorders, the video signal is first converted into a frequency-modulated signal (FM signal) and recorded on the tape. During playback, this FM signal is picked up from the tape and demodulated into the original video signal. Therefore, when certain recordings on one tape are played back and re-recorded onto another tape (either in dubbing or editing), the actual process taking place is as follows: the player picks up the FM signal from the tape, returns it to the original video signal through demodulation and transmits the video signal to the recorder, while the recorder accepts this video signal, converts it into the FM signal and records it on the tape.
However, in the FM-FM dubbing system, the player transmits the FM signal as picked up from the tape, without demodulating it, and the recorder directly records the FM signal on the tape. This means that in the FM-FM dubbing system the process of modulating and demodulating is omitted, thus eliminating any deterioration of picture quality inherent in this process. Therefore, FM-FM dubbing produces dupes of better picture quality compared with the ordinary dubbing system (VIDEO-VIDEO dubbing).
It is essential in both VIDEO-VIDEO and FM-FM dubbing that the servo systems of the recorder be synchronized with the signal being recorded. For this purpose, VIDEO-VIDEO dubbing employs a vertical sync signal which can be separated from the input video signal as a reference signal for the servo systems. However, in FM-FM dubbing, it is difficult to separate the vertical sync signal from the input FM signal. This necessitates the application of a separate reference sync signal. The following two methods are available for this purpose:

1. Apply the demodulated video signal from the player (the output signal at the VIDEO OUT connector of the player) to the VIDEO IN connector of the recorder. In this case, the SYNC select switch of the recorder should be set to VIDEO.
2. Apply the same external sync signal to the SYNC IN connectors of both the player and recorder. In this case, the SYNC select switches of both the player and recorder should be set to EXT.

OPERATING PRECAUTIONS WHEN USED IN AN EDITING CONFIGURATION

H-phase adjustment
For editing with improved accuracy, the recorder is equipped with a horizontal phase control which enables the H phase of the recorder to be precisely aligned with the H phase of the player. For this purpose, proceed as follows:

1. Set the H-PHASE control of the player to its centre click position.
2. Engage the recorder in the Insert Edit mode.
3. While starting and stopping insert edits repeatedly, turn the H-PHASE control of the recorder until the LED indicator above the H-PHASE control lights. This can also be confirmed on the monitor screen (internal sync monitor) on which the horizontal sync signal will no longer be visible when the horizontal phases of both the recorder and player have been perfectly aligned.

H-PHASE indicator and H-PHASE control
The LED indicator above the H-PHASE control doubles as the frame servo indicator and as the horizontal phase indicator. In conjunction with the setting of the FRAME SERVO switch on the rear panel, this LED indicator functions in the following manner:

1. With the FRAME SERVO switch set to ON
   The indicator will light if the input signal to be edited has the same horizontal phase as the playback video signal. In practice, before starting editing, adjust the H-PHASE control so that the indicator lights.
   Notes:
   - If there is no input signal, the H-PHASE control does not function and the indicator extinguishes.
   - During recording or editing, the H-PHASE control does not function with the indicator lighted.
2. With the FRAME SERVO switch set to OFF
   The indicator remains off and the H-PHASE control does not function.

Synchronization of the editing servo
The servo circuit of the recorder is locked to the input video signal or the external sync signal regardless of the editing mode selected.

Therefore, when the recorder's SYNC select switch is set to the VIDEO position, its servo circuit is affected by the playback conditions of the player. For instance, if the player is in the Still or Search mode, the playback picture from the recorder (while in the Play mode) may become unsynchronized.

In order to obtain a stable playback picture from the recorder, it is recommended that the player be in the Stop mode or in the Play mode (if the tape on the player contains normal recordings), or use an external sync signal with the SYNC select switch set to the EXT position.

The reference sync signal for the servo systems during recording and playback differs depending on the settings of the SYNC and INPUT select switches and the conditions of the signals applied to the input terminals.

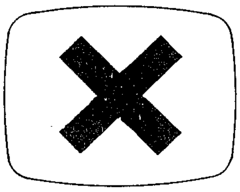
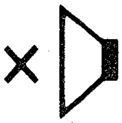
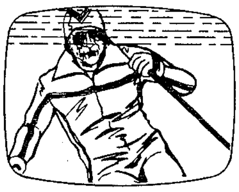
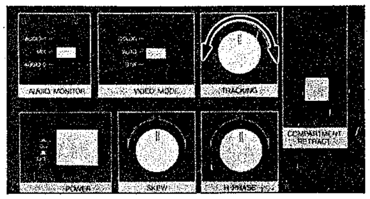
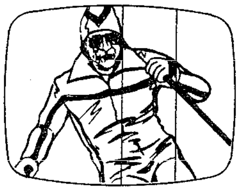
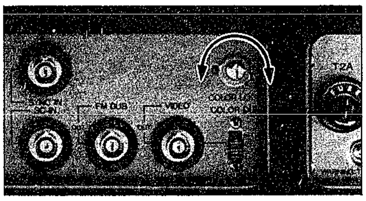
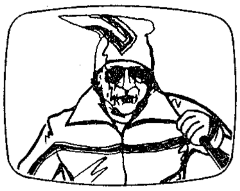
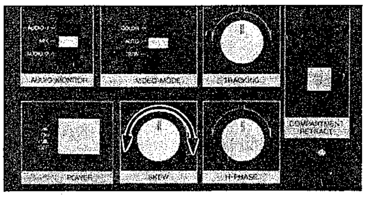
FRAME SERVO switch
During tape-to-tape dubbing using tapes with an inferior playback picture S/N ratio, duplicates of more than three generations, tapes recorded using random-interlaced ITV cameras or edited using other manufacturers' editors, picture distortion may occur at edit points. This is due to malfunctioning of the framing servo. To avoid this, set the FRAME SERVO switch to the OFF position.

Monitor synchronization in the Still and Search modes
The playback video signal incorporates a vertical sync pulse (V-pulse) so that the monitor remains synchronized even in the Still and Search modes. Because of this pulse, if other manufacturers' monitors are used, horizontal sync may be partially lost (the top of the picture may be distorted). If this happens, unplug connector P129 (STILL PULSE) of the head amplifier circuit board. (For details consult a JVC Service Dealer.)

- When the STILL PULSE connector is removed, horizontal sync might become unstable, depending on the position of noise bars.

We recommend use of the external sync mode
The external sync mode (EXT SYNC) will stabilize the entire servo system, thereby producing stabler playback pictures. We recommend use of the external sync mode whenever possible.

IN CASE OF DIFFICULTY

Symptoms	Check points	Remarks
No picture, No sound  	- Check if the VTR/TV switch of the TV monitor is set to the VTR position. If not, set it to VTR.	- For more information refer to the instruction manual of the TV monitor.
Noise bars or smeared picture 	- Check if the TRACKING control has moved off centre. - Turn the TRACKING control slowly until the picture clears. 	- After playing back the tape, return this control to its centre click-stop position.
Monochrome picture, wrong tint or colour stripes 	- Turn the COLOR LOCK control slowly until the correct colours are obtained. 	- Adjustment of colour, tint, brightness and contrast cannot be done with this control. - After playing back the tape, return this control to its centre click-stop position.
Skew – upper portion of the picture drifts horizontally. 	- Use the SKEW control to correct this phenomenon. - First turn the V-hold control of the television so that the frame line (corresponding to the blanking period) can be seen and turn the SKEW control slowly in either direction until slight bending of this frame line is corrected. 	- Do not turn the SKEW control during recording. - After playing back the tape, return this control to its centre click-stop position.

SPECIFICATIONS

GENERAL

Power requirement	: 110/127/220/240 V∿, ±10 % 50/60 Hz, 105 W (max. 115 W with RM-88U Editing Control Unit)
Dimensions	: 56.4(W) x 22.1(H) x 47.1(D) cm
Weight	: 30.6 kg
Operating temperature	: 5°C to 40°C
Operating position	: Horizontal only
Tape speed	: 9.53 cm/sec
Playing time	: Max. 60 min. with JVC KCA-60
Fast forward/Rewind time	: Within 4 min. 30 sec. for 60 min. tape
Wow & flutter	: Less than 0.15 % RMS

VIDEO

Playback system	: Rotary two-head, helical scanning system
Video signal system	: PAL-type colour signal, 625 lines (CCIR standard)
Output Line/TV	: 1.0 Vp-p, 75 ohms
FM dubbing	: 0.5 Vp-p, 75 ohms
Signal-to-Noise ratio	: More than 46 dB (colour), More than 48 dB (B/W) (Rohde & Schwarz noise meter)
Horizontal resolution	: Monochrome 330 lines Colour 250 lines
SC input	: 2.0 Vp-p, 75 ohms
Sync input	: 0.5 – 4.0 Vp-p, 75 ohms
Video mode select	: COLOR/AUTO/BW
Sync select	: EXT/INT

AUDIO

Output Line	: -20/0 dBs, low impedance, balanced
Monitor	: 0 dBs, low impedance, balanced
Headphone	: -28 dBs, 8 ohms load, unbalanced
TV	: 0 dBs, low impedance, unbalanced
Signal-to-Noise ratio	: More than 48 dB (at 3 % distortion level)
Frequency response	: 50 to 15000 Hz
Monitor output select	: CH-1/MIX/CH-2

CONNECTORS

RF OUT	: AERIAL connector
Video output	: BNC connector
FM dubbing output	: BNC connector
Sync/SC input	: BNC connector
Audio Line output	: XLR connector
Monitor out	: XLR connector
Headphone	: 6 mm jack
TV output	: EIAJ 8-pin TV connector
AC in	: 3-wire IEC socket
Remote control	: 45-pin connector
ACCESSORIES	: Monitor cable Dust cover

Design and specifications subject to change without notice.

CP-5550E
LECTEUR DE CASSETTES VIDEO COULEUR

SYSTEME D'ALIMENTATION

Branchement au réseau d'alimentation

La tension de fonctionnement de cet appareil est réglée en usine sur 240 V∿.

Avant de brancher l'appareil sur la prise secteur, s'assurer que le réglage du sélecteur de tension situé sur le panneau arrière corresponde bien à la tension secteur du réseau d'alimentation local.

Adaptation à la tension secteur locale

Cet appareil fonctionne aussi bien sur 110, 127 ou 220 volts que sur 240 volts∿, courant alternatif.

Si la tension préréglée est différente de celle de la tension secteur locale, régler le sélecteur de tension en introduisant un tournevis dans la fente du sélecteur de tension et en tournant jusqu'à ce que la tension convenable soit indiquée.

ATTENTION

Pour éviter tout risque d'électrocution, ne pas ouvrir le coffret. Aucune pièce interne n'est à régler par l'utilisateur. Se référer à un agent qualifié en cas de problème.

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PRECAUTIONS A OBSERVER

Maniement et stockage

- Eviter d'utiliser le CP-5550E dans les conditions suivantes:
  - dans les endroits soumis à des températures extrêmes de chaleur, de froid ou à l'humidité,
  - dans les endroits poussiéreux,
  - à proximité d'appareils générateurs de champs magnétiques puissants,
  - dans les endroits soumis à des vibrations, et
  - dans les endroits mal aérés.
- Faire attention à la condensation due à l'humidité.
  Eviter d'utiliser le CP-5550E immédiatement après avoir transporté celui-ci d'un endroit froid à un endroit chaud, ou bien immédiatement après avoir réchauffé une pièce qui était auparavant froide, car la vapeur d'eau contenue dans l'air se condense sur les têtes vidéo, le tambour et les guides de bande qui sont encore froids. Cette humidité risque d'endommager la bande et l'appareil.
- Prendre soin du CP-5550E.
  - Ne pas placer le protège-poussière (fourni) du lecteur sur celui-ci quand vous vous en servez.
  - Ne pas boucher les ouïes d'aération.
  - Ne pas poser d'objets lourds sur le lecteur.
  - Ne pas poser d'objets risquant de se renverser et d'endommager le haut du couvercle du lecteur
  - Utiliser l'appareil uniquement en position horizontale.
- En cas de transport.
  - Eviter d'infliger des chocs violents en cours de transport ou d'emballage.
  - Avant l'emballage, ne pas oublier de retirer la cassette.

Cassettes vidéo

- Utiliser des cassettes vidéo aux normes U3/4" de série KCA. Cependant, les cassettes plus petites KCS-20 peuvent être aussi utilisées avec ce lecteur. Pour mettre en place une cassette KCS-20 dans ce lecteur, il est nécessaire d'aligner la fente guide de la cassette avec l'arête guide située sur le porte-cassette.

CARACTERISTIQUES GENERALES

Moteurs de tambour de têtes et de cabestan à entraînement direct

Le tambour de têtes et le cabestan sont asservis par un moteur CC à entraînement direct et sans balai pour vous donner une stabilité excellente à long terme.

Châssis en aluminium moulé, garantie d'une fiabilité durable

Une grande fiabilité et un fonctionnement à longue échéance pour le mécanisme de commande de la bande sont rendus possibles grâce au châssis en aluminium moulé, au mécanisme de chargement de bande à deux moteurs et au mécanisme électrique d'éjection de la cassette.

Système d'asservissement des bobines et moteurs des bobines indépendants

La stabilité du transport de bande est encore améliorée par des moteurs indépendants au niveau alimentation qui entraînent les bobines d'enroulement et par le servomécanisme des bobines qui conserve une tension constante non seulement en lecture mais aussi en avance rapide et en réembobinage, de sorte qu'il n'y a jamais de surtension sur la bande, à petite ou à grande vitesse.

Doublage FM-FM pour des copies encore meilleures

Dans le système de doublage FM-FM les signaux sont transférés sous forme de signaux FM, ce qui amoindrit la dégradation de la qualité de l'image et fait du CP-5550E le lecteur maître idéal pour des productions et des copies dans le domaine du software.

Connecteurs de type professionnel

Des connecteurs de type BNC sont utilisés pour la sortie des signaux vidéo et des connecteurs à 3 broches XLR pour les signaux de sortie audio.

Commande de phase horizontale

Pour que le CP-5550E soit parfaitement synchronisé avec la phase horizontale d'autre équipement pour assurer un montage extrêmement précis.

Compteur d'alignement

Pour que vous puissiez régler l'alignement très précisément, le CP-5550E est muni d'un compteur d'alignement indépendant.

Commande du cadran pour vitesses variables

La vitesse de la lecture peut être continuellement variée de 0 (pause) à 5 fois la vitesse ordinaire, en sens avant et arrière à l'aide du cadran rotatif du contrôleur de montage.

Commande logique assistée par micro-ordinateur

Le système de commande logique à micro-ordinateur permet de changer directement de mode sans passer par la touche d'arrêt. Ce dispositif rend possible la télécommande totale de toutes les fonctions.

Asservissement du cabestan et fonction de verrouillage externe

L'asservissement du cabestan permet à la lecture d'être verrouillée aux signaux de synchronisation externes. La prise d'entrée de la sous-porteuse externe accepte le raccordement d'un correcteur de base de temps.

Compeur de bande électronique en temps réel

Le compteur de bande est commandé électroniquement; il a des tubes fluorescents pour vous permettre de le lire clairement et facilement. Le cadran indique le temps écoulé jusqu'à 59 minutes 59 secondes, ce qui rend le répertoriage aisé.

Mécanisme de recherche automatique

Ceci permet le repérage automatique de n'importe quel segment de la bande à l'aide du compteur de bande.

Mécanisme de répétition automatique

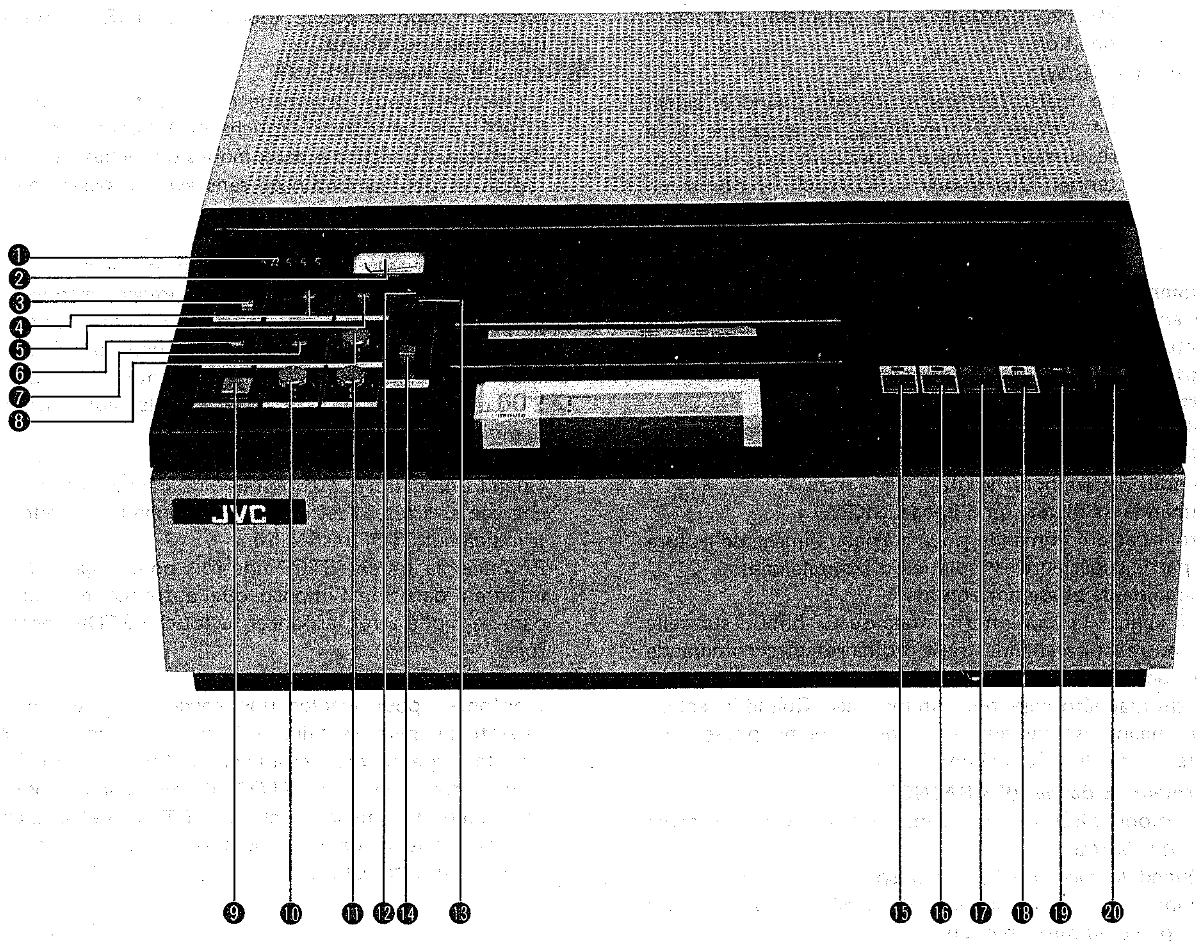
Quand le mode de répétition automatique est sélectionné, la bande est automatiquement réenroulée jusqu'à son début et la lecture recommence alors.

Mode attente incorporé pour une plus grande facilité de fonctionnement

Quand vous enfoncez la touche d'arrêt (STOP) dans n'importe quel mode, le mode attente est alors engagé, et puisque la bande reste enroulée autour du tambour de têtes en attente, le mode lecture peut alors immédiatement commencer.

COMMANDES ET CONNECTEURS

PANNEAU DE COMMANDE



❶ **Compteur de bande**
Ce compteur de bande en temps réel à 4 chiffres indique le temps de la bande qui défile jusqu'à 59 minutes 59 secondes.

❷ **Commande d'alignement (TRACKING)**
Quand vous réglez l'alignement, tourner la commande TRACKING ❽ de manière à ce que l'aiguille de ce compteur ait une déviation maximum.

❸ **Touche de remise à zéro du compteur (COUNTER RESET)**
Pour remettre le compteur à "00:00".

❹ **Sélecteur de mode automatique (AUTO MODE)**
Ce sélecteur choisit les fonctionnements automatiques spécialement liés au réembobinage.

Recherche: (SEARCH) La bande s'arrête automatiquement quand elle est réembobinée et que le compteur indique "00:00", l'appareil entre alors dans le mode arrêt.

Arrêt (OFF): Aucun fonctionnement automatique.

Répétition: (REPEAT) Quand la bande est réenroulée jusqu'à son début, elle s'arrête, puis elle est rechargée automatiquement pour que la lecture recommence.

❺ **Sélecteur de synchronisation (SYNC)**
Pour sélectionner entre les différents signaux de synchronisation de référence pour l'asservissement en enregistrement.

❻ **Sélecteur de contrôle audio (AUDIO MONITOR)**
Ce sélecteur sélectionne la sortie audio disponible sur la prise TV à 8 broches, le jack de casque d'écoute ou la prise de contrôle audio (AUDIO MONITOR).

AUDIO-1:	Pour écouter la canal-1.
MIX:	Pour écouter le son mélangé des canaux audio -1 et -2.
AUDIO-2:	Pour écouter le canal-2

❼ **Sélecteur de mode vidéo (VIDEO MODE)**
Choisier l'une des trois positions suivant le signal en lecture.
Couleur: Le mettre sur cette position quand le signal (COLOR) vidéo de lecture est un signal couleur.
Automatique (AUTO):
Le circuit est automatiquement commuté entre couleur et noir et blanc, pour avoir une lecture optima. Si vous utilisez cette position avec des signaux noir et blanc, vous obtenez une résolution de l'image supérieure. Mettre d'ordinaire le sélecteur sur cette position.
Noir et blanc (B/W):
Le mettre sur cette position quand le signal de lecture est un signal monochrome. Une résolution d'image supérieure est alors obtenue. Une diode LED vous empêche de produire par erreur des signaux couleur en noir et blanc. Cet indicateur s'allume quand le sélecteur est sur B/W.

❽ **Commande d'alignement (TRACKING)**
Pour enlever les barres parasites qui apparaissent pendant la lecture, tourner cette commande de manière à ce que le compteur TRACKING ❷ ait une déviation maximum.

❾ **Interrupteur d'alimentation (POWER)**
L'enfoncer pour mettre en circuit. Les compteurs et l'affichage du compteur s'illuminent. L'enfoncer à nouveau pour mettre hors circuit.

❿ **Commande de distorsion d'image (SKEW)**
Tourner cette commande pour corrigez l'image de lecture si sa partie supérieure est aplatie horizontalement.

⓫ **Commande de phase horizontale**
Sert à aligner la phase horizontale du CP-5550E sur celle d'un autre appareil. Mettre d'ordinaire cette commande sur sa position centrale et régler la phase horizontale avec celle du magnétoscope pour un montage. Quand le lecteur et le magnétoscope entrent dans la même phase, l'indicateur à diode LED s'allume.

⓬ **Indicateur de danger (WARNING)**
Cette diode LED s'allume dans les cas suivants, et toute fonction s'arrête.
1) Quand le mécanisme du transport de bande ne fonctionne pas correctement et qu'aucune bande n'est enroulée ou mise en circuit.
2) Quand la lampe de détection de la fin de bande n'est pas branchée.
3) Quand le moteur du tambour s'arrête et
4) Quand le senseur de condensation se met en marche.
   - Quand cette diode LED s'allume mettre immédiatement l'appareil hors circuit.

⓭ **Indicateur du verrouillage du système d'asservissement (SERVO LOCK)**
S'allume quand le système d'asservissement est verrouillé pour un fonctionnement normal.

⓮ **Levier d'abaissement du compartiment cassette (COMPARTMENT RETRACT)**
Le pousser en arrière pour abaisser le compartiment cassette vide. Quand le lecteur n'est pas en marche, le compartiment cassette doit être dans sa position abaissée.
- N'utiliser ce levier que pour abaisser le compartiment cassette vide, non pas pour insérer une cassette.

⓯ **Touche d'avance rapide (FF)**
Elle a deux fonctions: l'avance rapide et la recherche avant. Cette touche peut être enfoncée à partir de n'importe quel mode. Quand elle est enfoncée en mode lecture, la recherche avant est mise en route et la bande défile à environ 15 fois la vitesse ordinaire. Que ce soit en recherche avant ou en avance rapide, l'indicateur FF s'allume toujours. Pour mettre fin à l'un de ces deux modes, enfoncer n'importe quelle touche sauf celle d'éjection (EJECT) selon le mode que vous voulez.

⓰ **Touche de réembobinage (REW)**
Elle a deux fonctions: retour arrière et réembobinage. Cette touche peut être enfoncée à partir de n'importe quel mode. Quand elle est enfoncée dans le mode lecture, la recherche arrière est mise en route et la bande défile environ à 15 fois la vitesse normale. Que ce soit en retour arrière ou en réembobinage l'indicateur REW s'allume toujours. Pour mettre fin à l'un de ces deux modes, enfoncer n'importe quelle touche sauf EJECT, suivant le mode que vous voulez.

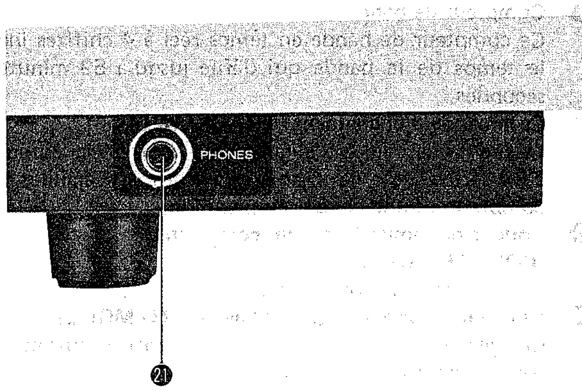
⓱ **Touche de lecture (PLAY)**
L'enfoncer pour commencer la lecture. L'indicateur PLAY s'allume alors. La touche PLAY peut être enfoncée directement à partir des deux modes de recherche, d'avance rapide et de réembobinage sans avoir à passer par celle d'arrêt (STOP).

⓲ **Touche d'arrêt sur image (STILL)**
L'enfoncer pour arrêter momentanément la bande. Pour mettre fin au mode arrêt sur image, enfoncer n'importe quelle touche sauf EJECT, suivant le mode que vous voulez. Si vous enfoncez la touche STOP à, partir d'un mode autre que celui d'attente, les indicateurs STILL et STOP vont s'allumer et le lecteur entrera dans le mode attente.

⓳ **Touche d'arrêt (STOP)**
Quand une cassette est insérée, la bande est partiellement chargée et arrêtée (cette situation s'appelle le mode arrêt). L'indicateur STOP reste allumé.
Enfoncer la touche STOP une fois pour engager le mode attente à partir de n'importe quel autre mode. Pour entrer dans le mode arrêt, enfoncer la touche STOP encore une fois.

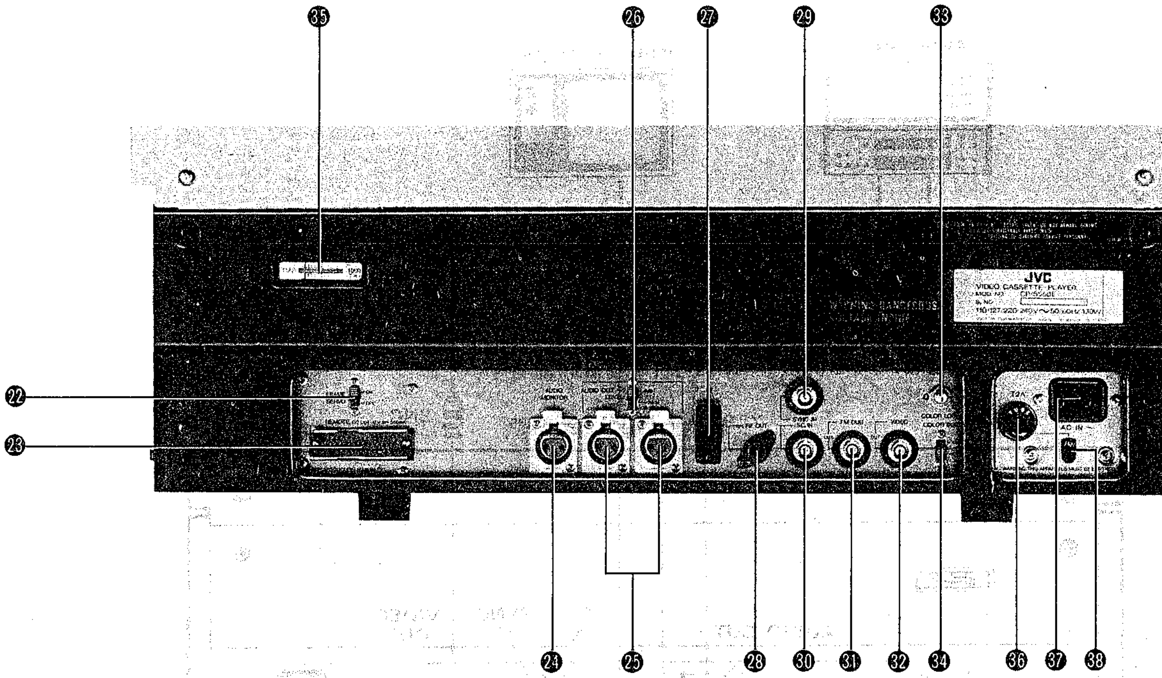
⓴ **Touche d'éjection (EJECT)**
L'enfoncer pour éjecter une cassette. L'éjection de la cassette ne peut se faire qu'à partir du mode arrêt ou attente. Quand vous enfoncez la touche EJECT après avoir enfoncé celle de STOP, l'indicateur à diode LED situé au-dessus de la touche EJECT se met à clignoter. Une fois que le déchargement de la bande est fini, la cassette est automatiquement éjectée.

PANNEAU FRONTAL



㉑ **Jack de casque d'écoute (PHONES)**
Raccorder un casque d'écoute ayant une impédance de 8 ohms. Vous pouvez entendre le canal audio sélectionné par le sélecteur AUDIO MONITOR ❻.

PANNEAU ARRIERE



㉒ **Commutateur d'asservissement image (FRAME SERVO)**
Placer normalement ce commutateur sur ON. Cependant, lorsque les bandes utilisées contiennent des signaux vidéo à entrelacement intermittent ou à faible rapport signal/bruit, le placer sur OFF.

㉓ **Borne de télécommande (REMOTE)**
Raccorder un boîtier de télécommande JVC à cette borne.

㉔ **Prises de sortie du contrôle audio (AUDIO MONITOR)**
Le signal audio sélectionné par le commutateur AUDIO MONITOR est disponible à cette prise.

㉕ **Prises de sortie de ligne audio (AUDIO OUT CH-1, CH-2)**
Prises de sortie audio des canaux-1 et 2.

㉖ **Sélecteur de sortie du niveau audio (AUDIO OUT LEVEL)**
Choisir 0 dB ou −20 dB suivant le niveau du signal de sortie audio. Le niveau est réglé simultanément sur chacun des deux canaux.

㉗ **Prise de moniteur télévision (TV)**
Cette prise d'entrée/sortie à 8 broches est destinée au raccordement d'un moniteur de télévision. Le signal audio choisi par le sélecteur AUDIO MONITOR est disponible à la prise de sortie audio.

㉘ **Prise de sortie HF (RF OUT)**
Le signal de sortie HF est disponible à cette prise. Raccorder un téléviseur ordinaire pour visionner la vidéocassette.

㉙ **Prise d'entrée du signal de synchronisation externe (SYNC IN)**
Cette prise d'entrée accepte un signal de référence de synchronisation externe quand le lecteur est en mode synchronisation externe. Le signal de synchronisation externe peut être un signal synchro composite ou un signal vidéo composite.

㉚ **Prise d'entrée de sous-porteuse (SC IN)**
Cette prise d'entrée accepte les signaux de sous-porteuse externe comme ceux provenant d'un correcteur à base de temps.

㉛ **Prises de sortie pour doublage FM (FM DUB OUT)**
Prise de sortie (OUT) pour doublage FM.

㉜ **Prise de sortie de ligne vidéo (VIDEO/OUT)**
Prise de sortie de ligne pour le signal vidéo.

㉝ **Commande de réglage de couleur (COLOR LOCK)**
La tourner pour corriger les couleurs de l'image de lecture si elle perd ses couleurs ou si celles-ci changent brusquement.

㉞ **Commutateur de copie couleur (COLOR DUB)**
Quand vous effectuez une copie d'une bande couleur sur un magnétoscope, mettre le commutateur sur ON. Ceci améliorera la qualité couleur de la bande qui reçoit la copie.

㉟ **Compteur de temps**
Il indique le temps global de fonctionnement. Après 1000 heures, la ligne rouge se déplace vers le côté droit de l'échelle.

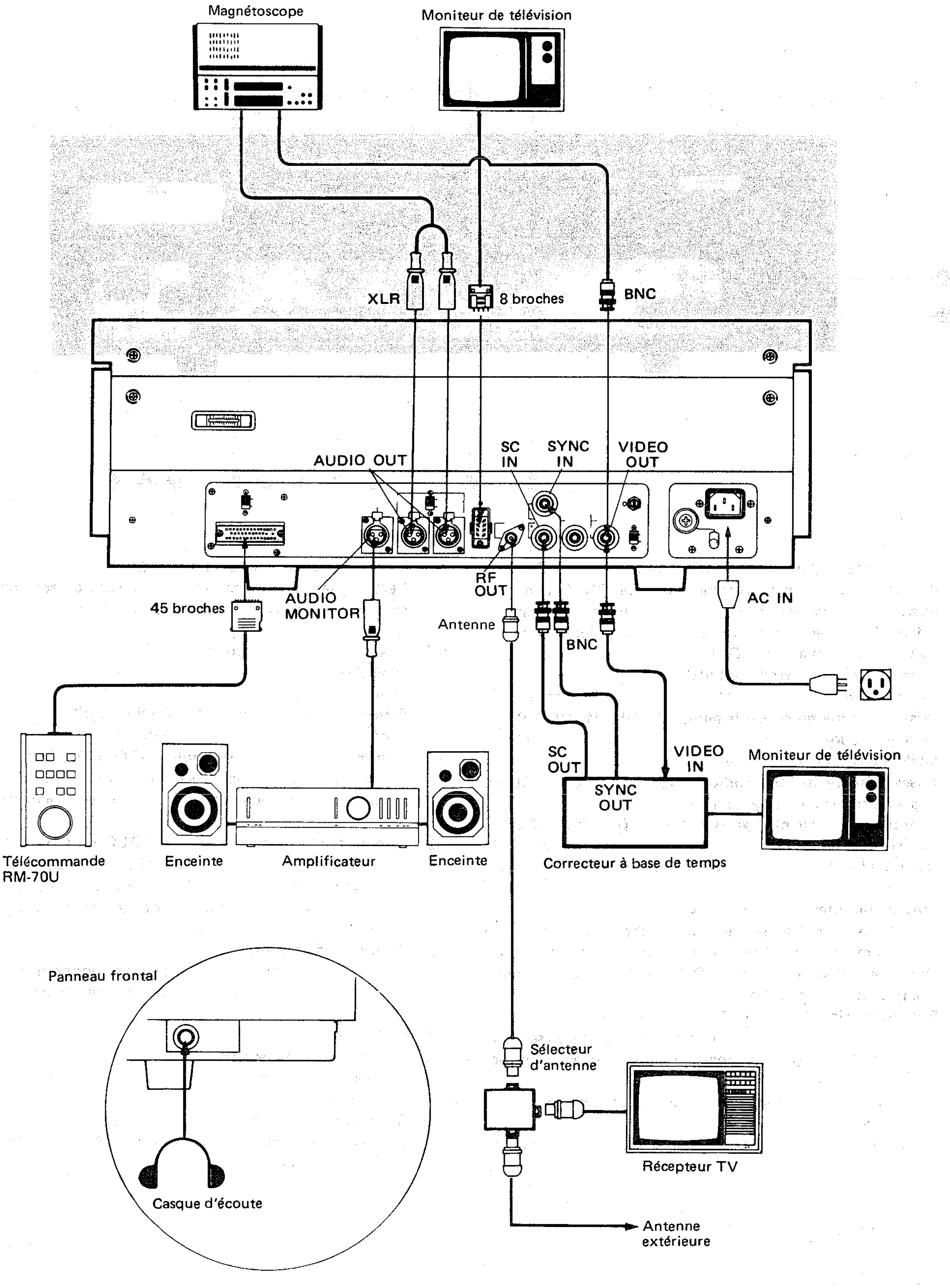
㊱ **Porte-fusible**

㊲ **Prise d'entrée secteur (AC IN)**
Raccorder cette prise à une prise secteur domestique en utilisant le câble d'alimentation.

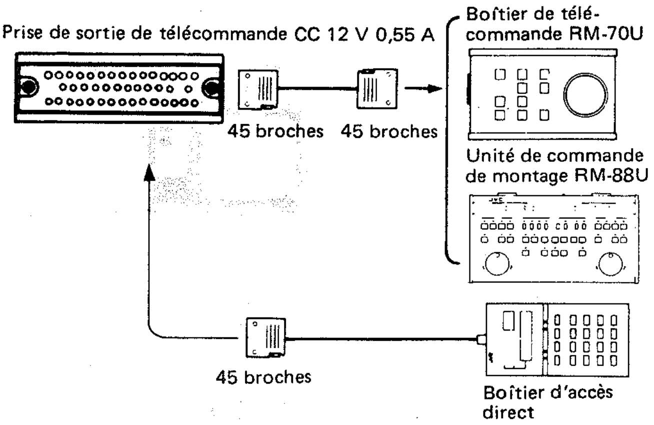
㊳ **Sélecteur de tension**
Le régler sur votre tension de réseau d'alimentation 110/127/220/240 V∿.

RACCORDEMENTS

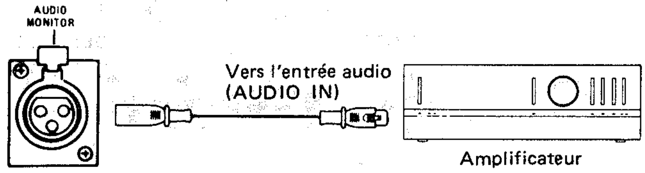
RACCORDEMENT D'EQUIPEMENT AUDIO ET VIDEO


Magnétoscope
Moniteur de télévision
XLR
8 broches
BNC
AUDIO OUT
SC IN
SYNC IN
VIDEO OUT
45 broches
AUDIO MONITOR
RF OUT
Antenne
BNC
AC IN
SC OUT
VIDEO IN
SYNC OUT
Moniteur de télévision
Télécommande RM-70U
Enceinte
Amplificateur
Enceinte
Correcteur à base de temps
Panneau frontal
Casque d'écoute
Sélecteur d'antenne
Récepteur TV
Antenne extérieure

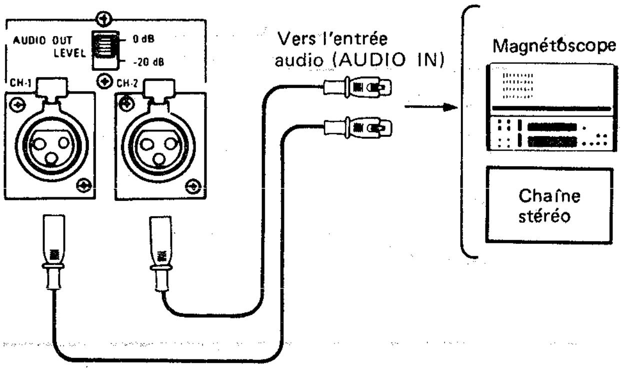
1. Prise de télécommande (REMOTE) (45 broches)


Prise de sortie de télécommande CC 12 V 0,55 A
Boîtier de télécommande RM-70U
45 broches
45 broches
Unité de commande de montage RM-88U
45 broches
Boîtier d'accès direct

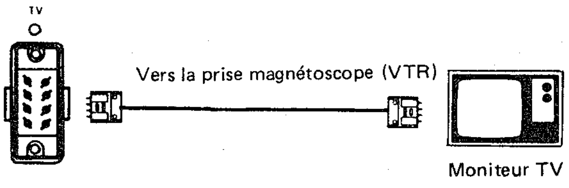
2. Prise de contrôle audio (AUDIO MONITOR) (XLR)


AUDIO MONITOR
Vers l'entrée audio (AUDIO IN)
Amplificateur

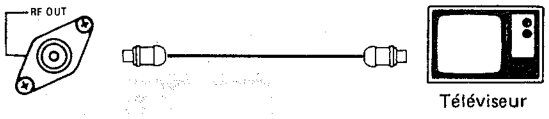
3. Prises de sorties audio (AUDIO OUT) (XLR)


AUDIO OUT LEVEL
0 dB
-20 dB
CH-1
CH-2
Vers l'entrée audio (AUDIO IN)
Magnétoscope
Chaîne stéréo

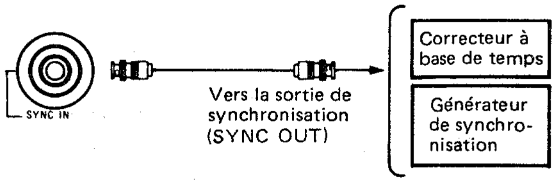
4. Prise de moniteur télévision TV (8 broches)


TV
Vers la prise magnétoscope (VTR)
Moniteur TV

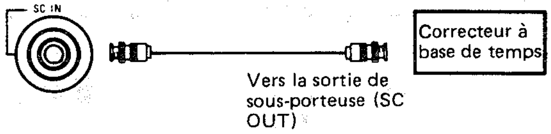
5. Prise de sortie HF (RF OUT)(antenne)


RF OUT
Téléviseur

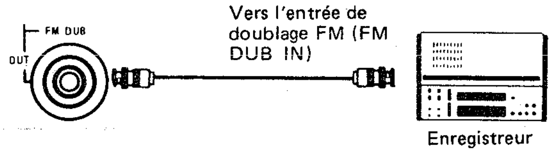
6. Prise d'entrée de synchronisation externe (EXTERNAL SYNC IN)(BNC)


SYNC IN
Vers la sortie de synchronisation (SYNC OUT)
Correcteur à base de temps
Générateur de synchronisation

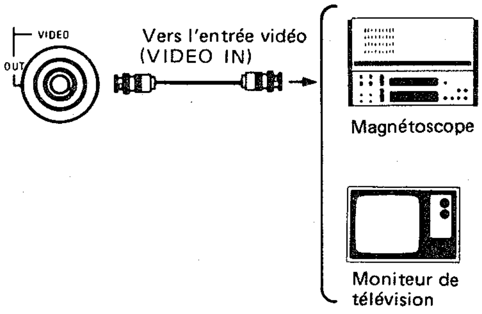
7. Prise d'entrée de sous-porteuse (SC IN)(BNC)


SC IN
Correcteur à base de temps
Vers la sortie de sous-porteuse (SC OUT)

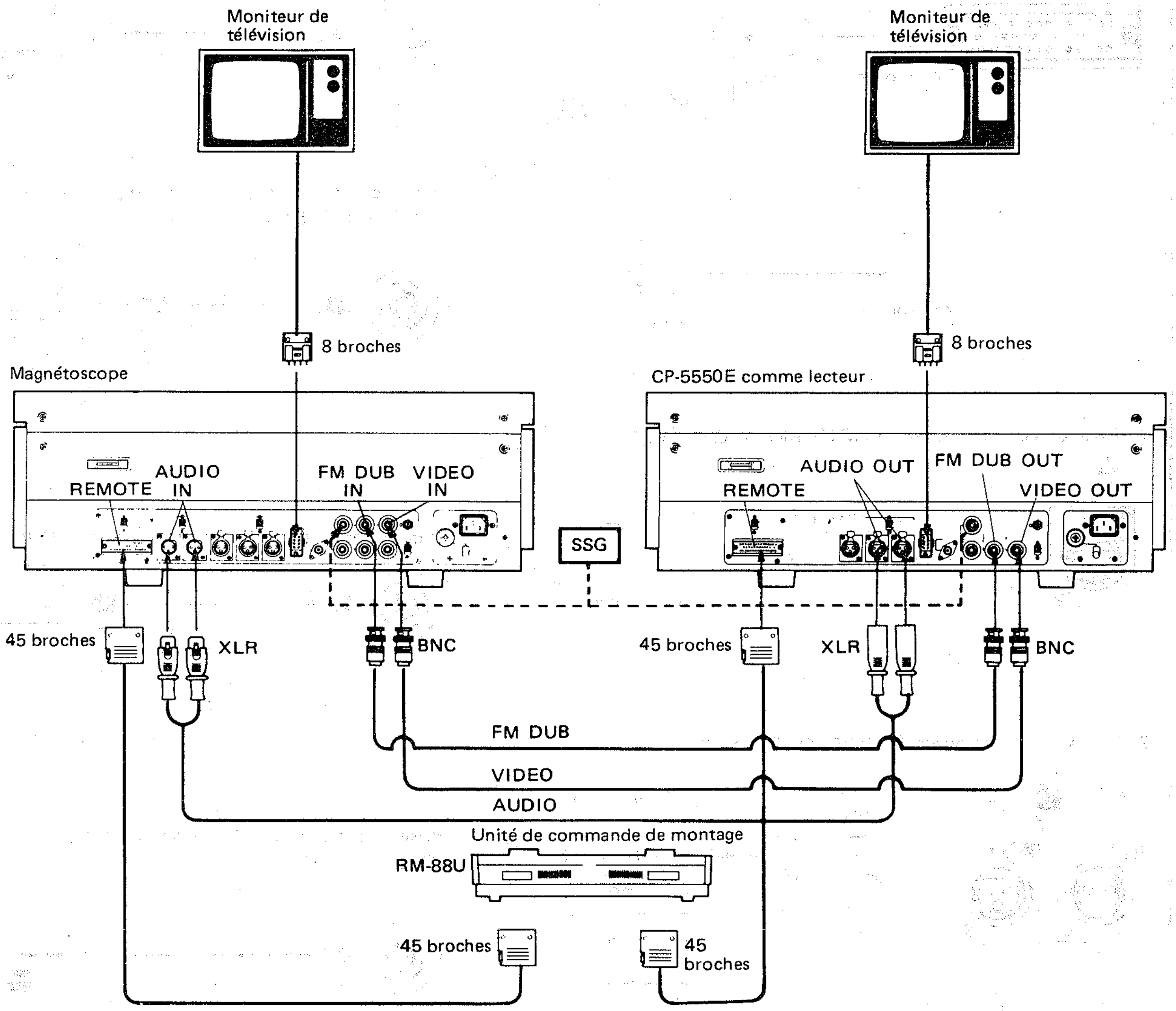
8. Prise de sortie de doublage FM (FM DUB OUT) (BNC)


Vers l'entrée de doublage FM (FM DUB IN)
FM DUB OUT
Enregistreur

9. Prise de sortie vidéo VIDEO OUT (BNC)


VIDEO OUT
Vers l'entrée vidéo (VIDEO IN)
Magnétoscope
Moniteur de télévision

RACCORDEMENTS POUR UN MONTAGE


Moniteur de télévision
Moniteur de télévision
8 broches
8 broches
Magnétoscope
CP-5550E comme lecteur
REMOTE
AUDIO IN
FM DUB IN
VIDEO IN
REMOTE
AUDIO OUT
FM DUB OUT
VIDEO OUT
SSG
45 broches
XLR
BNC
45 broches
XLR
BNC
FM DUB
VIDEO
AUDIO
Unité de commande de montage
RM-88U
45 broches
45 broches

MISE EN PLACE D'UNE VIDEOCASSETTE

1. Mettre l'interrupteur d'alimentation POWER sur ON.
2. Enfoncer la touche EJECT; le compartiment-cassette se soulève automatiquement.
3. Mettre tout à fait en place la vidéocassette dans son compartiment. Le compartiment-cassette va automatiquement s'abaisser et l'appareil entre dans le mode arrêt, l'indicateur à diode LED STOP étant allumé.
   - Si le compartiment-cassette ne s'abaisse pas comme il convient, vérifier que la cassette vidéo bien insérée. Ne jamais essayer d'abaisser le compartiment-cassette à l'aide du levier COMPARTMENT RETRACT si une cassette est en place.

MODE ATTENTE

Après que l'appareil soit entré dans le mode arrêt, enfoncer les touches STILL et STOP en même temps pour entrer dans le mode attente. Dans ce mode les indicateurs STILL et STOP sont tous deux éclairés. Pour entrer en mode attente à partir d'un autre mode, enfoncer simplement la touche STOP. Enfoncer la touche STOP une deuxième fois met le lecteur en mode arrêt.

Remarque:

Si l'alimentation est coupée alors que le compartiment-cassette est en train de se lever, l'éjection ne continuera pas une fois que vous refournirez de l'alimentation. Pour terminer l'éjection, enfoncer encore la touche EJECT quand l'appareil est de nouveau en circuit.

LECTURE

COMMENT PROCEDER

- D'ordinaire mettre le sélecteur VIDEO MODE sur AUTO. Si l'enregistrement est monochrome, le placer sur B/W. Dans ce cas, l'indicateur à diode LED B/W s'allume.

1. Enfoncer la touche PLAY. Son indicateur à diode LED s'allume et la lecture commence.
2. Régler les commandes d'alignement (TRACKING) et de distorsion d'image (SKEW) afin d'obtenir la meilleure image de lecture possible.
   - Si les couleurs de l'image de lecture sont anormales, les corriger en utilisant la commande de réglage de couleur (COLOR LOCK) située sur le panneau arrière.
3. Pour garder une image fixe durant la lecture, enfoncer la touche STILL. Pour libérer le mode arrêt sur image enfoncer la touche PLAY.
   - Quand la bande arrive en fin de course, elle entre dans le mode réembobinage.

Remarque:

Quand vous entrez dans le mode lecture à partir du mode arrêt, il se peut que l'image roule et qu'il n'y ait pas de couleurs pendant les deux premières secondes. Pour éviter ces phénomènes, commencer la lecture à partir du mode attente.

LECTURE A ASSERVISSEMENT EXTERNE

Lorsque la lecture doit être asservie par un signal de synchronisation externe, procéder de la manière suivante:

1. Appliquer un signal de synchronisation de référence à la prise d'entrée de synchronisation (SYNC IN). Utiliser un signal de synchronisation composite ou un signal vidéo composite comme signal de synchronisation de référence.
2. Régler le sélecteur de synchronisation SYNC sur la position EXT.
3. Enfoncer la touche PLAY pour commencer la lecture.

LECTURE A L'AIDE D'UN TELEVISEUR ET D'UN CONVERTISSEUR HF

Si vous rajoutez un convertisseur HF (en option), le CP-5550E est capable de lire des cassettes vidéo sur un téléviseur. Pour plus de détails concernant le montage du convertisseur HF, veuillez consulter votre revendeur JVC.

Lorsque vous utilisez un convertisseur HF, il est nécessaire de placer le sélecteur de canaux du téléviseur sur le même canal que celui du convertisseur HF.

Convertisseur HF	**Zones**	**Canaux**
KR-250EG	Europe continentale partielle*	Canaux 43—47 UHF, standard Europe continentale partielle
KR-250EK	Grande-Bretagne	Canaux 43—47 UHF, standard Grande-Bretagne

* Sauf la France

Remarque:

- Les convertisseurs HF modèles KR-250EG/250EK peuvent se régler sur les canaux 43 à 47. Introduire un tournevis dans l'ouverture n^{o} 3 du convertisseur. Tourner dans le sens des aiguilles d'une montre pour accroître la fréquence sur laquelle le convertisseur doit être réglé, et dans le sens inverse pour la diminuer.

LECTURE REPETEE

Quand vous souhaitez relire la bande, du début à la fin, procéder de la manière suivante:

1. Mettre le sélecteur AUTO MODE sur REPEAT.
2. Enfoncer la touche PLAY pour commencer la lecture. Quand la bande arrive à sa fin, elle est réenroulée jusqu'au début et la lecture est répétée automatiquement. Vous pouvez recommencer l'opération autant de fois que vous le souhaitez.

REEMBOBINAGE ET RECHERCHE ARRIERE

- Enfoncer la touche REW; le mode réembobinage démarre et l'indicateur de réembobinage à diode LED s'éclaire.
- Quand vous enfoncez la touche REW dans le mode arrêt c'est le mode réembobinage qui est déclenché. Si vous enfoncez la touche REW en mode lecture ou arrêt sur image c'est le mode recherche arrière qui est déclenché.

AVANCE RAPIDE ET RECHERCHE AVANT

- Enfoncer la touche FF. Le mode avance rapide démarre et l'indicateur FF à diode LED s'allume.
- Quand vous enfoncez la touche FF en mode arrêt, c'est le mode avance rapide qui est déclenché. Quand vous enfoncez la touche FF en mode lecture ou arrêt sur image, c'est le mode recherche avant qui est déclenché.

Remarque:
La vitesse de recherche est environ 15 fois celle de la vitesse normale. Si vous utilisez un boîtier de télécommande (en option), vous pouvez varier la vitesse de recherche de 0 à 5 fois la vitesse ordinaire en tournant le cadran de recherche de la télécommande; le mode recherche, à 15 fois la vitesse ordinaire peut être obtenu quand le cadran de recherche est tout à fait tourné dans la direction des vitesses croissantes. Il se peut que l'image roule pendant la recherche dans les deux directions si la vitesse est supérieure à 5 fois la vitesse ordinaire.

RECHERCHE PAR COMPTEUR

1. Remettre le compteur de bande à "00:00" à partir du segment que vous voulez relire.
2. Mettre le sélecteur AUTO MODE sur SEARCH.
3. Si vous souhaitez avancer rapidement ou rémbobiner la bande jusqu'à l'endroit où le compteur à été remis à zéro, enfoncer la touche FF ou REW.
4. Quand le compteur indique "00:00" la bande s'arrête automatiquement et le mode attente est engagé.

Remarque:
Il se peut que la bande défile au point "00:00" pendant 3 à 5 secondes.

REEMBOBINAGE AUTOMATIQUE

En mode lecture, quand la bande a été déroulée jusqu'au bout, elle est automatiquement réenroulée jusqu'au début et entre en mode attente. La recherche par compteur et la fonction de lecture répétée sont possibles pendant le réembobinage automatique. Quand la bande a été déroulée jusqu'au bout en mode avance rapide, le mode attente est engagé automatiquement.

COPIE DE BANDE

1. Raccorder ensemble les magnétoscopes lecteur et enregistreur suivant les instructions de la page 22.
2. Si le lecteur doit être asservi par un signal de synchronisation externe, placer le sélecteur SYNC du lecteur sur la position EXT.
3. Placer le sélecteur SYNC de l'enregistreur sur la position VIDEO.
4. Placer le sélecteur INPUT de l'enregistreur comme il convient.
   LINE: Placer sur cette position pour un doublage VIDEO-VIDEO.
   FM DUB: Placer sur cette position pour un doublage FM-FM.
   - Même lorsque le doublage FM-FM doit être effectué, prendre soin de raccorder la prise VIDEO OUT du lecteur à la prise VIDEO IN de l'enregistreur de la même manière que pour un doublage VIDEO-VIDEO.
5. Mettre le lecteur en mode lecture et l'enregistreur en mode enregistrement.

DOUBLAGE FM-FM

Avec les magnétoscopes à cassette, le signal vidéo est tout d'abord converti en un signal à fréquence modulée (signal FM) et enregistré sur la bande. Durant la lecture, ce signal FM est capté de la bande et démodulé en un signal vidéo original. Par conséquent, lorsque certains enregistrements d'une bande sont reproduits et réenregistrés sur une autre bande (doublage ou montage), le procédé réel prend place de la manière suivante: le lecteur capte le signal FM provenant de la bande, le convertit en un signal vidéo original au travers de la démodulation et transmet le signal vidéo à l'enregistreur qui accepte ce signal vidéo en le convertissant en un signal FM et en enregistrant celui-ci sur la bande.
Cependant, dans le système de doublage FM-FM, le lecteur transmet le signal FM comme il a été capté sur la bande, sans le démoduler, et l'enregistreur enregistre directement le signal FM sur la bande. Cela signifie que dans le système de doublage FM-FM, le procédé de modulation et démodulation est éliminé, ce qui évite toute détérioration de la qualité des images inhérente à ce procédé. Par conséquent, le doublage FM-FM permet d'obtenir des copies de meilleure qualité comparé avec le système de doublage ordinaire (doublage VIDEO-VIDEO).
Il est essentiel aussi bien lors du doublage VIDEO-VIDEO que du doublage FM-FM que les systèmes d'asservissement de l'enregistreur soient synchronisés avec le signal à enregistrer. De ce fait, le doublage VIDEO-VIDEO utilise un signal de synchronisation verticale qui peut être séparé du signal vidéo d'entrée comme un signal de référence pour les systèmes d'asservissement. Cependant, dans le doublage FM-FM, il est difficile de séparer le signal de synchronisation verticale du signal d'entrée FM. Ceci nécessite l'utilisation d'un signal de synchronisation de référence séparé. Voici deux méthodes utilisables dans ce but:

1. Appliquer le signal vidéo démodulé provenant du lecteur (le signal de sortie disponible à la prise de sortie vidéo du lecteur) à la prise d'entrée vidéo de l'enregistreur. Dans ce cas, le sélecteur de synchronisation (SYNC) de l'enregistreur devra être placé sur VIDEO.
2. Appliquer le même signal de synchronisation externe aux prises d'entrée de synchronisation du lecteur et de l'enregistreur. Dans ce cas, les sélecteurs de synchronisation (SYNC) du lecteur et de l'enregistreur devront être placés sur EXT.

PRECAUTIONS A PRENDRE LORS D'UN MONTAGE

Réglage de la phase horizontale
Pour donner des montages de la plus grande précision, ce magnétoscope est muni d'une commande de phase horizontale qui permet à la phase H du magnétoscope enregistreur d'être très précisément alignée sur celle du lecteur. Dans ce but procéder de la manière suivante:

1. Mettre la commande H-PHASE du lecteur sur sa position centrale de blocage.
2. Mettre l'enregistreur dans le mode montage par insertion.
3. Tout en commençant et en arrêtant plusieurs fois les montages par insertion, tourner la commande H-PHASE de l'enregistreur jusqu'à ce que l'indicateur à diode LED situé au dessus de la commande H-PHASE s'allume. Vous pouvez aussi vérifier sur l'écran du moniteur (moniteur à synchronisation interne) sur lequel le signal de synchronisation horizontale ne sera plus visible quand les deux phases H de l'enregistreur et du lecteur seront parfaitement alignées.

Commande et indicateur de phase horizontale (H-PHASE)
L'indicateur à diode LED situé au dessus de la commande H-PHASE sert à la fois d'indicateur d'asservissement image et de phase horizontale. En relation avec la commande d'asservissement image FRAME SERVO située sur le panneau arrière, cette diode LED fonctionne de la façon suivante:

1. Avec le commutateur FRAME SERVO sur ON
   Cet indicateur s'allume si le signal d'entrée qui doit être monté a la même phase horizontale que le signal vidéo de lecture. En pratique, avant de faire un montage, régler la commande H-PHASE pour que son indicateur s'éclaire.
   Remarques:
   - S'il n'y a pas de signal d'entrée, la commande H-PHASE ne fonctionne pas et l'indicateur s'éteint.
   - En enregistrement ou en montage, la commande H-PHASE fonctionne sans que son indicateur soit allumé.
2. Avec le commutateur FRAME SERVO sur OFF.
   L'indicateur reste éteint et la commande H-PHASE ne fonctionne pas.

Synchronisation du montage asservi
Le circuit d'asservissement du magnétoscope est verrouillé au signal d'entrée ou au signal de synchronisation externe quel que soit le mode de montage sélectionné.

Par conséquent, lorsque le sélecteur de synchronisation du magnétoscope est placé sur la position VIDEO, son circuit d'asservissement est affecté par les conditions de lecture du lecteur. Par exemple, si le lecteur est en mode arrêt sur image ou recherche, l'image de la lecture provenant de l'enregistreur (étant en mode de lecture) risque de ne plus être synchronisée.

Afin d'obtenir une image de lecture stable à partir de l'enregistreur, il est recommandé de mettre le lecteur en mode arrêt ou lecture (si la bande du lecteur ne contient que des enregistrements normaux), ou utiliser un signal de synchronisation externe en ayant au préalable placé le sélecteur de synchronisation sur la position EXT.

Le signal de synchronisation de référence des systèmes d'asservissement est différent en lecture et en enregistrement, suivant les positions des sélecteurs SYNC et INPUT et la nature des signaux appliqués aux bornes d'entrée.

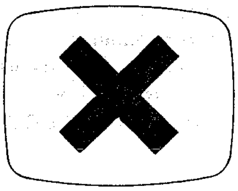
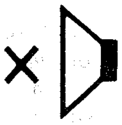
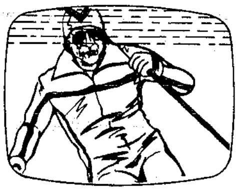
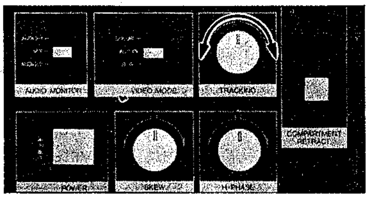
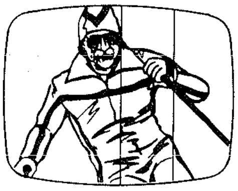
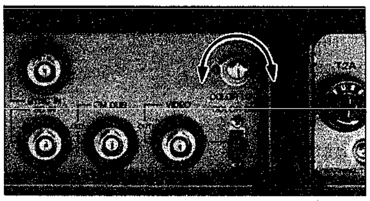
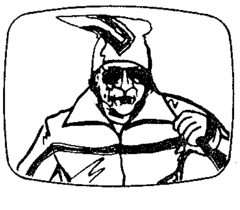
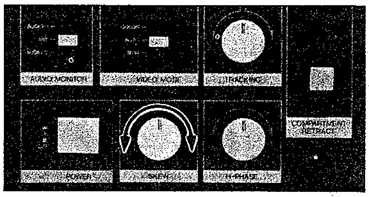
Commutateur d'asservissement image (FRAME SERVO)
Pendant un transfert de bande à bande, utiliser des bandes ayant un rapport signal/bruit faible, ou faire des copies de plus de trois générations, ou se servir de bandes enregistrées avec des caméras ITV à entrelacement intermittent ou montées par d'autres fabricants, risque de provoquer des distorsions d'image aux points de raccord. Ceci est dû à un mauvais fonctionnement de l'asservissement de l'image. Pour éviter ces phénomènes, mettre le commutateur FRAME SERVO sur la position OFF.

Synchronisation du moniteur dans les modes arrêt sur image et recherche
Le signal de lecture vidéo incorpore une impulsion de synchronisation verticale (impulsion V) de sorte que le moniteur reste synchronisé même dans les modes arrêt sur image et recherche. A cause de cette impulsion, si des moniteurs d'autres marques sont utilisés il se peut que la synchronisation horizontale soit partiellement perdue (la portion supérieure de l'image peut être distordue). Si jamais cela se produisait, débrancher la prise P129 d'impulsion fixe (STILL PULSE) du circuit de l'amplificateur de la tête (Pour de plus amples informations, consulter un revendeur JVC).

- Quand la prise STILL PULSE a été enlevée, il se peut que la synchronisation horizontale devienne instable, suivant la position des barres parasites.

Nous vous recommandons d'utiliser le mode de synchronisation externe
Le mode de synchronisation externe (EXT SYNC) stabilise tout le système d'asservissement, ce qui rend les images de lecture plus stables. Nous vous recommandons donc d'utiliser ce mode de synchronisation externe aussi souvent que possible.

GUIDE DE PREMIERE URGENCE

Symptômes	Remarques	Points à vérifier
Pas d'image, pas de son  	- Vérifier si le commutateur VTR/TV du moniteur de télévision est réglé sur la position VTR. Dans le cas contraire, le placer sur VTR.	- Pour de plus amples informations, se référer au manuel d'instruction du téléviseur.
Barres de parasites ou image souillée 	- Vérifier pour voir si la commande d'alignement (TRACKING) est placée au centre. - Tourner doucement la commande d'alignement (TRACKING) jusqu'à ce que les parasites disparaissent. 	- Une fois la lecture d'une bande particulière terminée remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.
Images en noir & blanc, de teintes incorrectes ou à bandes colorées 	- Tourner lentement la commande de réglage couleur (COLOR LOCK) jusqu'à ce que les couleurs redeviennent normales. 	- Les réglages de couleur, de teinte, de lumière et de contraste ne peuvent pas être effectués à l'aide de cette commande. - Une fois la lecture d'une bande particulière terminée, remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.
SKEW – La portion supérieure de l'image glisse horizontalement. 	- Utiliser la commande de distorsion (SKEW) pour corriger ce phénomène. - Tourner tout d'abord la commande de balayage vertical du téléviseur de sorte que la ligne d'image (correspondant à la période de suppression) puisse être vue et tourner lentement la commande de distorsion (SKEW) dans n'importe quelle direction jusqu'à ce que l'inclinaison de l'image soit corrigée. 	- Ne pas tourner la commande de distorsion (SKEW) durant l'enregistrement. - Une fois la lecture de cette bande terminée, remettre cette commande en position centrale, obtenue lorsque s'entend un déclic.

CARACTERISTIQUES TECHNIQUES

GENERAL
Alimentation : 110/127/220/240 V∿, ±10 % 50/60 Hz, 105 W (115 W max. avec l'unité de commande de montage RM-88U)
Dimensions : 56,4(L) x 22,1(H) x 47,1(P) cm
Poids : 30,6 kg
Plage de température de fonctionnement : 5°C à 40°C
Position de fonctionnement : Horizontale seulement
Vitesse de défilement : 9,53 cm/s
Durée d'enregistrement : 60 mn max. avec une bande KCA-60 de JVC
Durée d'avance rapide et de retour arrière : 4 min. 30 sec. avec une cassette de 60 mn
Pleurage et scintillement : Inférieur à 0,15 % RMS

VIDEO
Système de lecture : Système à balayage hélicoïdal à deux têtes rotatives
Système de signal vidéo : Signaux couleur de type PAL et signal CCIR standard, 625 lignes
Sortie Ligne/TV : 1,0 Vcc, 75 ohms
Doublage FM : 0,5 Vcc, 75 ohms
Rapport signal/bruit : Supérieur à 46 dB (couleur)
Supérieur à 48 dB (noir et blanc)
(mesureur de bruit Rohde & Schwarz)
Résolution horizontale : Monochrome 330 lignes
Couleur 250 lignes
Entrée de sous-porteuse : 2,0 Vcc, 75 ohms,
Entrée de synchronisation : 0,5 – 4,0 Vcc, 75 ohms
Sélecteur de mode vidéo : COLOR/AUTO/BW
Sélecteur de synchronisation : EXT/INT

AUDIO
Sortie Ligne : -20/0 dBs, basse impédance, symétrique
Contrôle : 0 dBs, basse impédance, symétrique
Casque d'écoute : -28 dBs, 8 ohms de charge, asymétrique
TV : 0 dBs, basse impédance. asymétrique
Rapport signal/bruit : Supérieur à 48 dB (niveau de distorsion de 3 %)
Réponse de fréquence : 50 à 15,000 Hz
Sélecteur de sortie de contrôle : CH-1/MIX/CH-2

CONNECTEURS
Sortie HF : Connecteur d'antenne
Sortie vidéo : Connecteur BNC
Sortie de doublage FM : Connecteur BNC
Entrée de synchronisation/sous-porteuse : Connecteur BNC
Audio Sortie de ligne : Prise XLR
Sortie de contrôle : Prise XLR
Casque d'écoute : Prise de 6 mm
Sortie TV : Connecteur TV à 8 broches EIAJ
Entrée secteur : Prise IEC à 3 fils
Télécommande : Connecteur à 45 broches

ACCESSOIRES
: Câble de contrôle
Couvercle anti-poussière

Présentation et caractéristiques modifiables sans préavis.

CP-5550E
FARB-VIDEO-KASSETTENWIEDERGABEGERÄT

SPANNUNGSVERSORGUNG

Anschluß an das Netz

Die Betriebsspannung dieses Gerätes ist werkseitig auf 240 V∿ Wechselspannung eingestellt.

Überprüfen Sie, ob der Spannungswähler auf der Geräterückseite auf Ihre Netzspannung eingestellt ist, bevor Sie das Gerät an das Netz anschließen.

Einstellung auf örtliche Netzspannung

Dieses Gerät kann mit 110, 127, 220 oder 240 V∿ Wechselspannung betrieben werden. Wenn die voreingestellte Spannung nicht mit Ihrer örtlichen übereinstimmt, stellen Sie den Spannungswähler neu ein. Führen Sie einen Schraubenzieher in den Schlitz des Spannungswählers ein und drehen Sie ihn, bis die korrekte Spannung angezeigt ist.

WICHTIG: Fernsehprogramme dürfen nur aufgenommen werden, wenn dadurch Autorenrechte oder andere Rechte Dritter nicht verletzt werden.

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VORSICHTSMASSNAHMEN

Betrieb und Lagerung

- Vermeiden Sie den Betrieb des CP-5550E unter folgenden Bedingungen:
  - an extrem heißen, kalten oder feuchten Orten
  - an staubigen Plätzen
  - in der Nähe von Geräten mit starkem magnetischem Feld
  - an starken Erschütterungen ausgesetzten Plätzen und
  - an schlecht belüfteten Plätzen.
- Vermeiden Sie Kondensationsfeuchtigkeit auf dem Gerät. Betreiben Sie den CP-5550E nicht gleich nach der Verlagerung von einem kalten an einen warmen Ort. Der Wasserdampf in der warmen Luft schlägt sich auf der noch kalten Videokopftrommel und Bandführung nieder, und diese Feuchtigkeit kann zu Schäden an Band und Rekorder führen.
- Behandeln Sie den CP-5550E schonend.
  - Die mitgelieferte Schutzhaube nicht beim Betrieb auf den Player setzen.
  - Verdecken Sie nicht die Belüftungsöffnungen.
  - Stellen Sie nichts auf das Gerät, das durch Verschütten die Innenteile des Players schädigen könnte.
  - Betreiben Sie das Gerät nur in horizontaler Stellung.
- Beim Transport ist zu beachten:
  - Der Player darf beim Verpacken und Transportieren keinen starken Erschütterungen ausgesetzt werden.
  - Die Kassette muß vor dem Verpacken aus dem Gerät entfernt werden.

Video-Kassetten

- Verwenden Sie 3/4" U-Standard-Videokassetten des Typs KCA. Sie können mit diesem Player aber auch die kleineren KCS-20-Kassetten verwenden. Um die KCS-20-Kassette in den Player einzulegen, müssen Sie die Kassettenführungsrille mit dem Führungswulst auf dem Kassettenhalter ausrichten.

MERKMALE

Direktantrieb-Motoren für Kopftrommel und Capstan

Die Kopftrommel und der Capstan werden von kollektorlosen Direktantrieb-Gleichstrom-Motoren angetrieben und bieten daher ausgezeichnete Stabilität und Dauerhaftigkeit.

Hohe Zuverlässigkeit und Dauerhaftigkeit durch Aluminium-Druckguß-Chassis

Die hohe Zuverlässigkeit und hohe Dauerhaftigkeit des Bandtransportmechanismus werden durch das Aluminium-Druckguß-Chassis, das zweimotorige zahnradgetriebene Bandladesystem und den elektrisch betriebenen Kassetten-Auswurfmechanismus gewährleistet.

Spulen-Servosystem mit unabhängigen Spulenmotoren

Die Stabilität des Bandtransports wird verbessert durch unabhängige Motoren für die Abwickel- und für die Aufwickelspule und durch das Spulen-Servosystem, das die Bandspannung nicht nur bei Wiedergabe, sondern auch beim Schnellvorlauf und Rückspulen konstant hält, so daß das Band bei niedriger oder hoher Geschwindigkeit nicht überlastet wird.

Kopf-zu-Kopf-Kopieren für verbesserte Kopien

Das Kopf-zu-Kopf-Kopiersystem, bei dem das komplette Videosignal (Chroma und Luminanz) ohne Modulation und Demodulation übertragen wird, reduziert die Abnahme der Bildqualität beim Kopieren. Dieses System macht den CP-5550E zum idealen Master-Player bei Software-Produktionen und Zuspieler in Kopier- und Schnitt-Systemen.

Professionelle Anschlußbuchsen

Für den Video-Ausgang wird ein BNC-Anschluß und für den Audio-Ausgang wird ein 3-pol. symmetrischer XLR-Anschluß verwendet.

H-Phasen-Regler

Der CP-5550E ist mit einem Horizontalphasen-Regler ausgestattet.

Tracking-Meßinstrument

Zur genauen Einstellung der Spurlage ist der CP-5550E mit einem unabhängigen Tracking-Meßinstrument ausgestattet.

Geschwindigkeitsregler

Mit dem Geschwindigkeitsregler der Schnittsteuereinheit (Sonderzubehör) kann die Wiedergabegeschwindigkeit stufenlos von Null (Standbild) bis zur 5-fachen Normalgeschwindigkeit in Vorwärts- und Rückwärtsrichtung eingestellt werden.

Logische Steuerung mit Mikroprozessor

Die logische Steuerung mit einem Mikroprozessor ermöglicht direkten Betriebsartenwechsel. Es ist nicht erforderlich, zuerst die Stop-Taste zu drücken. Ebenso erlaubt der Mikroprozessor die Fernbedienung aller wichtigen Funktionen des Players.

Capstan-Servosystem für externe Synchronisation

Das Capstan-Servosystem ermöglicht die Wiedergabe mit einem externen Sync-Signal. Der Eingang für ein externes Hilfsträgersignal ermöglicht den Anschluß eines Zeitfehler-Ausgleichers (TBC).

Elektronisches Echtzeit-Bandzählwerk

Das elektronische Bandzählwerk mit einem leicht abzulesenden Fluoreszenz-Display zeigt die abgelaufene Zeit bis zu 59 Minuten 59 Sekunden und erleichtert das Indexieren.

Automatische Such-Funktion

Diese Funktion erfolgt in Verbindung mit dem Bandzählwerk, so daß jede Bandstelle automatisch gesucht werden kann.

Automatische Wiederhol-Funktion

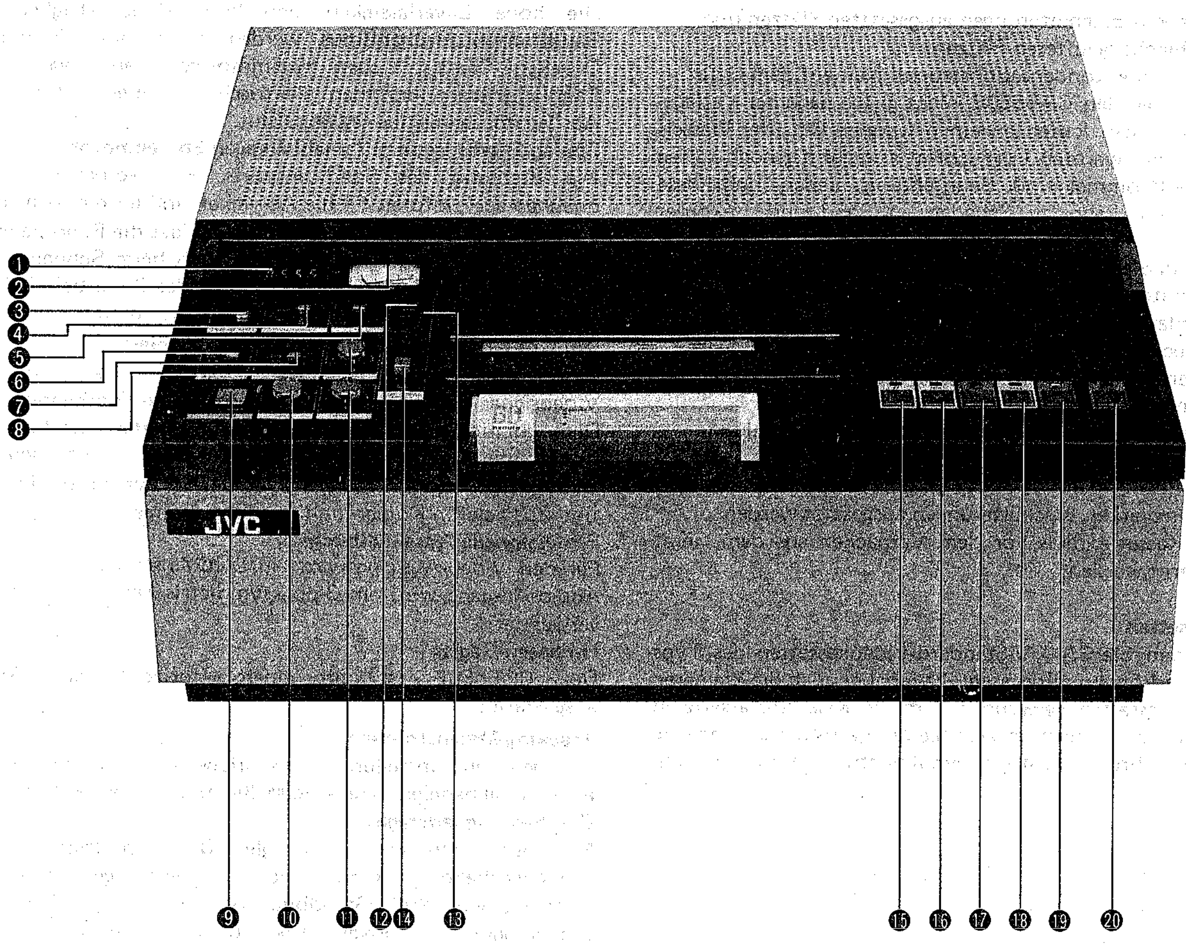
Bei der automatischen Wiederholung wird das Band am Bandende automatisch zurückgespult und wiederholt.

Bereitschafts-Betriebsart

Wenn in irgendeiner Betriebsart die Stop-Taste gedrückt wird, schaltet das Gerät auf Bereitschaft. In dieser Betriebsart bleibt das Band eingefädelt, so daß unmittelbar auf Wiedergabe-Betrieb geschaltet werden kann.

BEDIENELEMENTE UND ANSCHLUSSBUCHSEN

BEDIENFELD



❶ **Bandzählwerk**
Das 4-stellige Echtzeit-Bandzählwerk zeigt die abgelaufene Bandmenge bis 59 Minuten 59 Sekunden.

❷ **Spurlagen-Meßinstrument (TRACKING)**
Zur Einstellung der Spurlage den TRACKING-Regler ❽ so einstellen, daß die Nadel dieses Meßinstruments maximal ausschlägt.

❸ **Zählwerk-Rückstelltaste (COUNTER RESET)**
Zum Zurückstellen des Bandzählwerks auf 00:00.

❹ **Auto-Betriebsart-Schalter (AUTO MODE)**
Dieser Schalter dient zum Wählen der automatischen Betriebsart in Bezug zum Rückspulen.

SEARCH:	Das Band stoppt automatisch, wenn es bis zu dem Punkt zurückgespult ist, der der Zählwerk-Anzeige "00:00" entspricht, und das Gerät schaltet auf die Stop-Betriebsart.
OFF:	Kein automatischer Betrieb.
REPEAT:	Wenn das Band zum Beginn zurückgespult ist, stoppt es automatisch und wird dann automatisch wieder eingefädelt, um die Wiedergabe zu wiederholen.

❺ **Synchronisation-Wahlschalter (SYNC)**
Zur Wahl zwischen verschiedenen Referenz-Sync-Signalen für die Servosysteme.

❻ **Tonkontroll-Wahlschalter (AUDIO MONITOR)**
Dieser Schalter wählt den Tonausgang, der am 8-pol. TV-Anschluß, der Kopfhörerbuchse oder dem AUDIO MONITOR-Anschluß anliegt.

AUDIO-1:	Zum Hören des Tons von Kanal 1.
MIX:	Zum Hören des gemischten Tons von Kanal 1 und Kanal 2.
AUDIO-2:	Zum Hören des Tons von Kanal 2.

⑦ **Videobetriebsart-Wahlschalter (VIDEO MODE)**
Entsprechend des Ausgangssignals bei der Wiedergabe eine der drei Positionen wählen.

COLOR:	Auf diese Position stellen, wenn das Wiedergabe-Videosignal ein Farbsignal ist.
AUTO:	In dieser Stellung wird der Schaltkreis automatisch zwischen Farbe und Schwarz/Weiß geschaltet und ermöglicht so optimale Wiedergabe. In dieser Position wird bei Schwarz/Weiß-Signalen eine höhere Bildauflösung erzielt. Der Schalter sollte normalerweise in dieser Position stehen.
B/W:	Auf diese Position stellen, wenn das Wiedergabesignal ein Monochromsignal ist. Dann wird eine höhere Bildauflösung erzielt. • Eine LED-Anzeige leuchtet, wenn der Schalter auf B/W steht.

⑧ **Spurlagen-Regler (TRACKING)**
Diesen Regler so drehen, daß das TRACKING-Meßinstrument ② maximal ausschlägt, um Störzeilen bei der Wiedergabe zu entfernen.

⑨ **Netzschalter (POWER)**
Zum Einschalten der Spannungsversorgung diesen Schalter drücken. Die Pegel-Meßinstrumente und das Zählwerk-Display sind erleuchtet. Durch nochmaliges Drücken wird die Spannungsversorgung wieder ausgeschaltet.

⑩ **Schrägverzerrungs-Regler (SKEW)**
Diesen Regler drehen, um das Wiedergabebild zu korrigieren, wenn der obere Teil horizontal verzerrt ist.

⑪ **Horizontalphasen-Regler (H-PHASE)**
Zum Angleichen der Horizontalphase des CP-5550E an die der anderen Ausrüstung. Normalerweise diesen Regler auf die mittlere Einrastposition stellen und zum Schneiden die H-Phase mit dem Regler des Rekorders einstellen. Wenn der Rekorder und der Player phasengleich sind, leuchtet die LED-Anzeige.

⑫ **Warn-Anzeige (WARNING)**
Diese LED leuchtet in den folgenden Fällen. Dann werden alle Funktionen gestoppt.
1) Wenn der Bandtransport nicht ordnungsgemäß funktioniert und kein Band ab- oder aufgewickelt wird.
2) Wenn die Bandende-Abtastlampe abgetrennt ist.
3) Wenn der Trommelmotor stoppt.
4) Wenn der Kondensations-Sensor anspricht.
   - Wenn diese LED leuchtet, die Spannungsversorgung sofort ausschalten.

⑬ **Servoverriegelung-Anzeige (SERVO LOCK)**
Leuchtet, wenn das Servosystem für normalen Betrieb verriegelt ist.

⑭ **Kassettenfach-Rückzieh-Hebel (COMPARTMENT RETRACT)**
Diesen Hebel nach hinten ziehen, um das leere Kassettenfach zurückzuziehen. Wenn der Player nicht in Betrieb ist, sollte das Kassettenfach in der zurückgezogenen Position sein.
- Diesen Hebel nur zum Zurückziehen des leeren Kassettenfachs und nicht zum Einlegen einer Kassette verwenden.

⑮ **Schnellvorlauf-Taste (FF)**
Diese Taste hat zwei Funktionen: Schnellvorlauf und Vorwärts-Suche. Diese Taste kann in jeder Betriebsart gedrückt werden. Wenn sie bei der Wiedergabe gedrückt wird, wird auf Vorwärts-Suche geschaltet. Das Band läuft dann mit etwa der 15-fachen Normalgeschwindigkeit. In beiden Funktionen, Schnellvorlauf und Vorwärts-Suche, leuchtet die FF-Anzeige. Zum Freigeben des Schnellvorlaufs und der Vorwärts-Suche eine Taste entsprechend der nächsten gewünschten Betriebsart außer EJECT drücken.

⑯ **Rückspul-Taste (REW)**
Diese Taste hat zwei Funktionen: Rückspulen und Rückwärts-Suche. Diese Taste kann in jeder Betriebsart gedrückt werden. Wenn sie bei der Wiedergabe gedrückt wird, wird auf Rückwärts-Suche geschaltet. Dann läuft das Band mit etwa der 15-fachen Normalgeschwindigkeit. In beiden Funktionen, Rückspulen und Rückwärts-Suche, leuchtet die REW-Anzeige. Zum Freigeben des Rückspulens und der Rückwärts-Suche eine Taste entsprechend der nächsten gewünschten Betriebsart außer EJECT drücken.

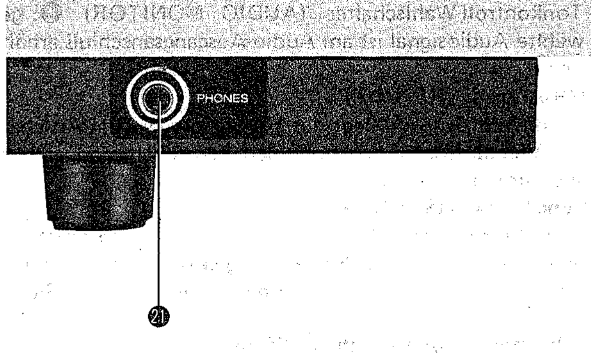
⑰ **Wiedergabe-Taste (PLAY)**
Diese Taste zum Starten der Wiedergabe drücken. Die PLAY-Anzeige leuchtet. Die PLAY-Taste kann in der FF- und REW-Betriebsart direkt gedrückt werden, ohne daß zuerst die STOP-Taste gedrückt werden muß.

⑱ **Standbild-Taste (STILL)**
Diese Taste zum Unterbrechen des Bandlaufs bei Wiedergabe drücken. Zum Freigeben der Standbild-Betriebsart eine Taste entsprechend der als nächstes gewünschten Betriebsart außer EJECT drücken. Durch Drücken der STOP-Taste in jeder Betriebsart außer Bereitschaft leuchten die STILL- und die STOP-Anzeige, und der Player schaltet auf die Bereitschafts-Betriebsart.

⑲ **Stop-Taste (STOP)**
Wenn eine Kassette eingelegt wird, wird das Band automatisch teilweise eingefädelt und gestoppt (dieser Zustand wird als Stop-Betriebsart bezeichnet). Die STOP-Anzeige bleibt erleuchtet.
Zum Einschalten der Bereitschafts-Betriebsart in jeder Betriebsart die STOP-Taste einmal drücken. Die STOP-Taste noch einmal drücken, um auf die Stop-Betriebsart zu schalten.

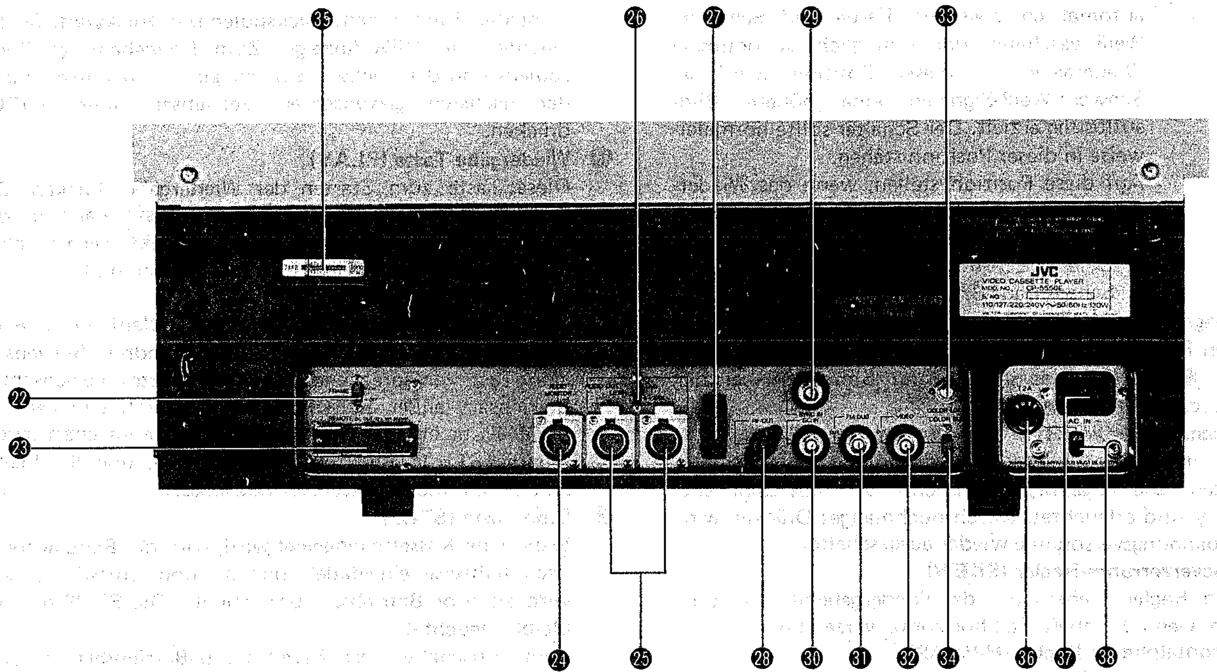
⑳ **Auswurf-Taste (EJECT)**
Diese Taste zum Auswerfen der Kassette drücken. Die Kassette kann nur in der Stop- und der Bereitschafts-Betriebsart ausgeworfen werden. Wenn die EJECT-Taste gedrückt wird, nachdem die STOP-Taste gedrückt wurde, fängt die LED-Anzeige über der EJECT-Taste an zu blinken. Nachdem das Band in die Kassette zurückgezogen wurde, wird die Kassette automatisch ausgeworfen.

FRONTPLATTE



㉑ **Kopfhörerbuchse (PHONES)**
Zum Anschluß eines Kopfhörers mit einer Impedanz von 8 Ohm. Der mit dem AUDIO MONITOR-Wahlschalter ⑥ gewählte Kanal wird gehört.

RÜCKPLATTE



㉒ **Bildservo-Schalter (FRAME SERVO)**
Dieser sollte normalerweise auf ON stehen. Bei Bändern ohne Zeilensprung oder mit sehr niedrigem Störabstand stellen Sie ihn auf OFF.

㉓ **Fernsteuerungsanschluß (REMOTE)**
Schließen Sie hier ein JVC-Fernsteuergerät an.

㉔ **Tonkontroll-Ausgang (AUDIO MONITOR)**
Das mit dem AUDIO MONITOR-Schalter gewählte Tonsignal liegt an diesem Ausgang an.

㉕ **Audio-Ausgangsanschlüsse (AUDIO OUT CH-1, CH-2)**
Tonausgänge für Kanal 1 und 2.

㉖ **Tonausgangspegel-Wahlschalter (AUDIO OUT LEVEL)**
Entsprechend des Pegels des Tonausgangs auf 0 dB oder -20 dB stellen. Der Pegel wird für beide Tonkanäle gleichzeitig geschaltet.

㉗ **Fernseh-Monitor-Anschluß (TV)**
Dies ist ein 8-poliger Eingang/Ausgang-Anschluß für die Verbindung mit einem Fernseh-Monitor. Das mit dem Tonkontroll-Wahlschalter (AUDIO MONITOR) ❻ gewählte Audiosignal ist am Audio-Ausgangsanschluß erhältlich.

㉘ **HR-Ausgang (RF OUT)**
An diesem Ausgang liegt das HF-Signal an. Zum Ansehen des Videobandes einen normalen Fernsehempfänger hier anschließen.

㉙ **Sync-Eingang (SYNC IN)**
Zum Betrieb des Players mit externer Synchronisation wird hier das Sync-Signal eingegeben. Das externe Sync-Signal kann ein Sync-Signal oder ein BAS-Signal sein.

㉚ **Hilfsträgereingang-Anschluß (SC IN)**
Eingangsanschluß für den Empfang externer Hilfsträgersignale, wie etwa von einem Zeitfehler-Ausgleicher (TBC= Time Basis Corrector).

㉛ **Kopf-zu-Kopf-Kopieren-Anschluß (FM DUB OUT)**
Ausgang für Kopf-zu-Kopf-Kopieren.

㉜ **Videosignal-Anschluß (VIDEO OUT)**
Ausgang für Videosignal.

㉝ **Farbsynchronisier-Regler (COLOR LOCK)**
Durch Drehen dieses Reglers werden die Wiedergabebilder korrigiert, wenn sie die Farben verlieren oder wenn die Farben sich fehlerhaft verändern.

㉞ **Farbkopier-Schalter (COLOR DUB)**
Beim Kopieren eines in Farbe aufgenommenen Bandes auf einen Rekorder diesen Schalter auf ON stellen. Dadurch wird die Farbqualität der Kopie verbessert.

㉟ **Betriebsstunden-Messer**
Hier wird die gesamte Betriebszeit angezeigt. Nach 1000 Betriebsstunden bewegt sich die rote Linie zum Ende der Skala.

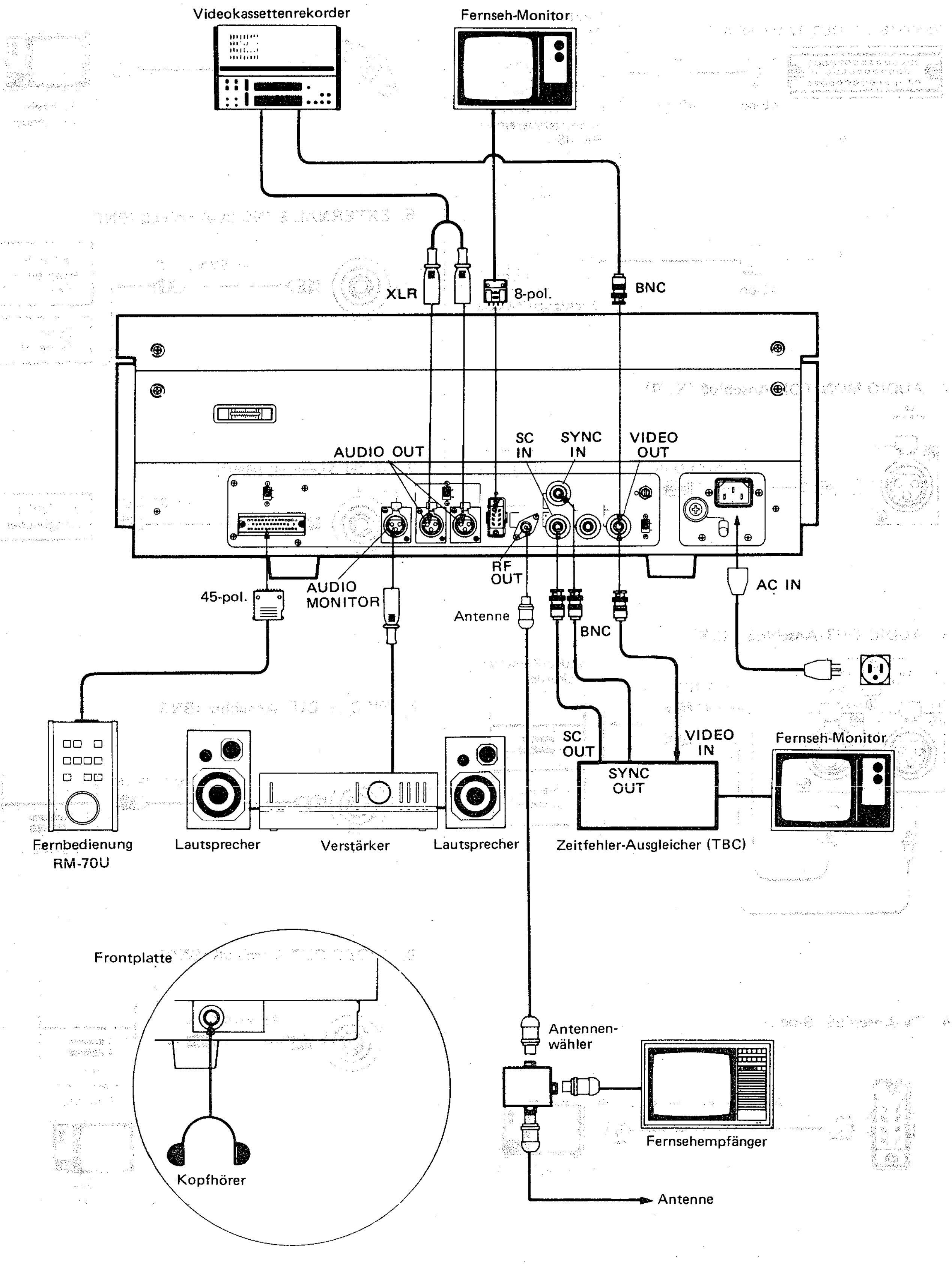
㊱ **Sicherung (FUSE)**

㊲ **Buchse für Netzkabelanschluß (AC IN)**

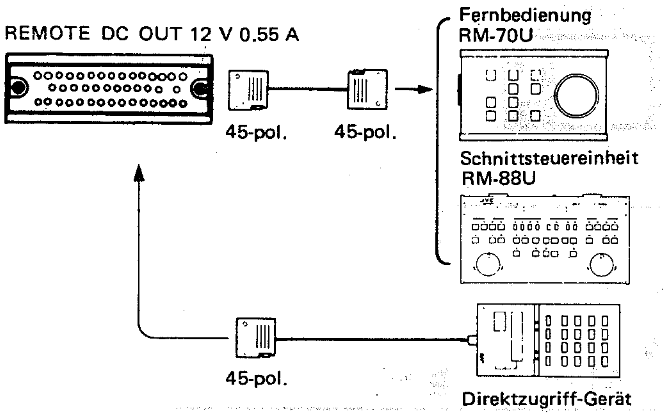
㊳ **Netzspannungswähler**
Stellen Sie ihn auf Ihre örtliche Netzspannung ein: 110/127/220/240 V∿ Wechselstrom.

ANSCHLÜSSE

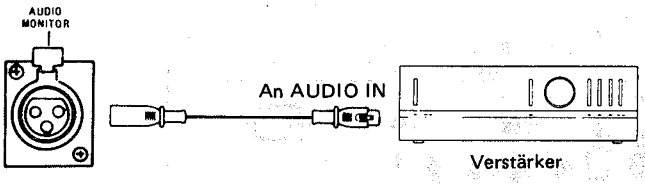
ANSCHLÜSSE VON VIDEO- UND AUDIO-GERÄTEN


Videokassettenrekorder
Fernseh-Monitor
XLR
8-pol.
BNC
AUDIO OUT
SC IN
SYNC IN
VIDEO OUT
45-pol.
AUDIO MONITOR
RF OUT
Antenne
BNC
AC IN
SC OUT
VIDEO IN
SYNC OUT
Fernseh-Monitor
Fernbedienung RM-70U
Lautsprecher
Verstärker
Lautsprecher
Zeitfehler-Ausgleicher (TBC)
Frontplatte
Kopfhörer
Antennenwähler
Fernsehempfänger
Antenne

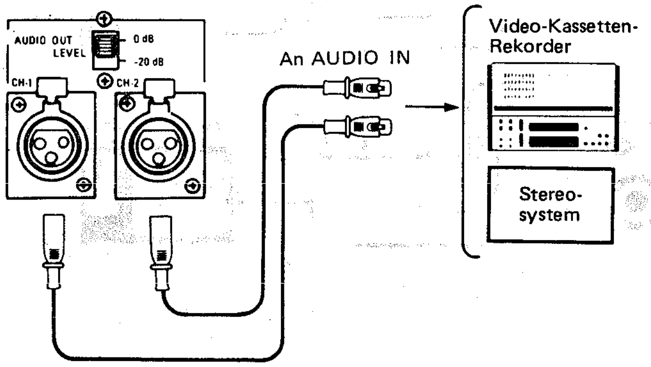
1. REMOTE-Anschluß (45-pol.)


REMOTE DC OUT 12 V 0.55 A
45-pol.
45-pol.
Fernbedienung
RM-70U
Schnittsteuereinheit
RM-88U
45-pol.
Direktzugriff-Gerät

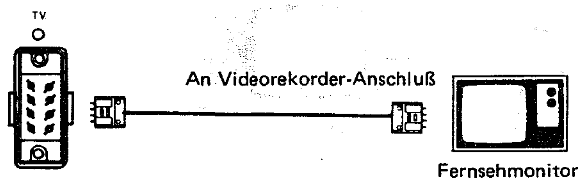
2. AUDIO MONITOR-Anschluß (XLR)


AUDIO
MONITOR
An AUDIO IN
Verstärker

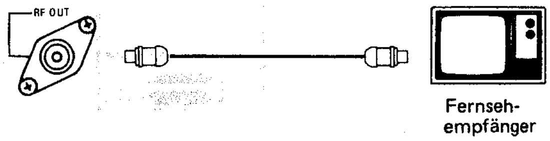
3 AUDIO OUT-Anschluß (XLR)


AUDIO OUT
LEVEL
0 dB
-20 dB
CH-1
CH-2
An AUDIO IN
Video-Kassetten-
Rekorder
Stereo-
system

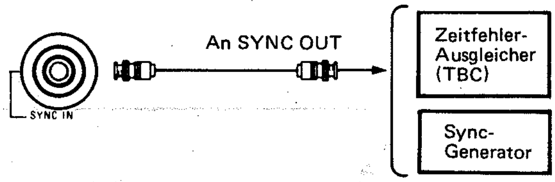
4. TV-Anschluß (8-pol.)


TV
An Videorekorder-Anschluß
Fernsehmonitor

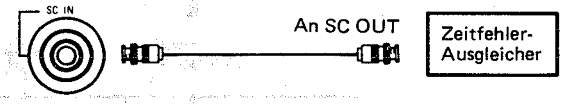
5. RF OUT-Anschluß (Antenne)


RF OUT
Fernseh-
empfänger

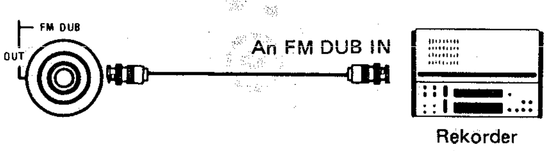
6. EXTERNAL SYNC IN-Anschluß (BNC)


SYNC IN
An SYNC OUT
Zeitfehler-
Ausgleicher
(TBC)
Sync-
Generator

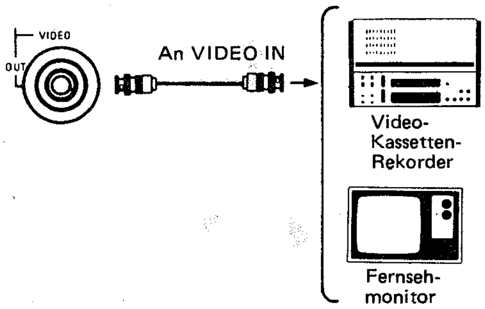
7. SC IN-Anschluß (BNC)


SC IN
An SC OUT
Zeitfehler-
Ausgleicher

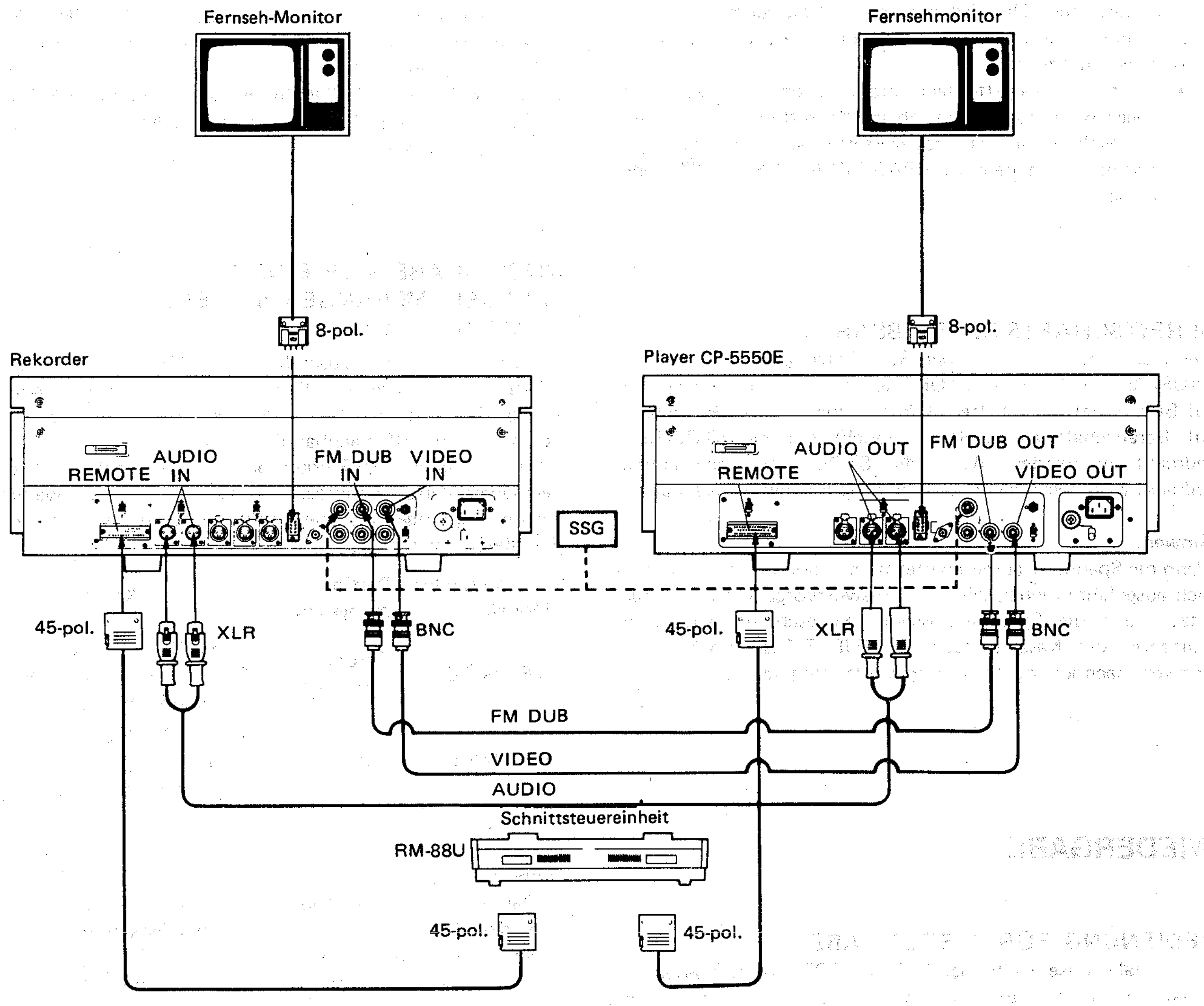
8. FM DUB OUT-Anschluß (BNC)


FM DUB
OUT
An FM DUB IN
Rekorder

9. VIDEO OUT-Anschluß (BNC)


VIDEO
OUT
An VIDEO IN
Video-
Kassetten-
Rekorder
Fernseh-
monitor

SCHNITT-ANSCHLÜSSE


Fernseh-Monitor
Fernsehmonitor
8-pol.
8-pol.
Rekorder
Player CP-5550E
REMOTE
AUDIO IN
FM DUB IN
VIDEO IN
REMOTE
AUDIO OUT
FM DUB OUT
VIDEO OUT
SSG
45-pol.
XLR
BNC
45-pol.
XLR
BNC
FM DUB
VIDEO
AUDIO
Schnittsteuereinheit
RM-88U
45-pol.
45-pol.

EINLEGEN EINER VIDEOKASSETTE

1. Die POWER-Taste auf ON drücken.
2. Die EJECT-Taste drücken, das Kassettenfach wird automatisch ausgefahren.
3. Eine Videokassette ganz in das Kassettenfach einschieben. Das Kassettenfach wird automatisch zurückgezogen, und das Gerät schaltet auf die Stop-Betriebsart, die Stop-LED-Anzeige leuchtet.
   - Wenn das Kassettenfach nicht automatisch zurückgezogen wird, überprüfen, ob die Kassette richtig eingelegt ist. Nicht versuchen, das Kassettenfach (mit eingelegter Kassette) mit dem COMPARTMENT RETRACT-Hebel zurückzuziehen.

BEREITSCHAFTS-BETRIEBSART

Wenn sich das Gerät in der Stop-Betriebsart befindet, die PAUSE/STILL- und die STOP-Taste gleichzeitig drücken, um auf Bereitschaft zu schalten. Um aus einer anderen Betriebsart auf Bereitschaft zu schalten, braucht nur die STOP-Taste gedrückt zu werden. Wenn die STOP-Taste noch einmal gedrückt wird, wird wieder auf die Stop-Betriebsart geschaltet.

Hinweis:

Wenn die Spannung ausgeschaltet wird, während das Kassettenfach ausgefahren wird, wird der Auswurfvorgang nicht fortgesetzt, wenn die Spannung wieder eingeschaltet wird. Zum Ausfahren des Kassettenfachs die EJECT-Taste noch einmal drücken, nachdem die Spannung wieder eingeschaltet ist.

WIEDERGABE

BEDIENUNG FÜR WIEDERGABE

- Normalerweise sollte der VIDEO MODE-Wahlschalter auf AUTO stehen. Bei der Wiedergabe von Monochrom-Aufnahmen kann er auf B/W gestellt werden. Dann leuchtet die B/W-LED-Anzeige.

1. Die PLAY-Taste drücken. Die PLAY-LED-Anzeige leuchtet, und die Wiedergabe startet.
2. Stellen Sie die Spurlagen (TRACKING)- und Schrägverzerrungs (SKEW)-Regler so ein, daß Sie eine optimale Bildwiedergabe erhalten.
   - Wenn die Farbe des Wiedergabebildes ungewöhnlich ist, müssen Sie sie mit dem Farbsynchronisier-Regler (COLOR LOCK) an der Rückseite des Gerätes entsprechend einstellen.
3. Wenn Sie das Standbild betrachten wollen, müssen Sie während der Aufnahme die Standbild-Taste (STILL) drücken. Drücken Sie die Wiedergabetaste (PLAY), wenn Sie den Standbildbetrieb beenden wollen.
   - Wenn das Bandende erreicht wird, schaltet das Gerät auf Rückspulen.

Hinweis:

Wenn aus der Stop-Betriebsart auf Wiedergabe geschaltet wird, kann das Bild in den ersten 1 bis 2 Sekunden wandern, und es erscheinen eventuell keine Farben. Um dies zu vermeiden, sollte die Wiedergabe aus der Bereitschafts-Betriebsart gestartet werden.

WIEDERGABE MIT EXTERNER SYNCHRONISATION

Wenn Sie die Wiedergabe mit einem externen Sync-Signal synchronisieren wollen, müssen Sie folgendermaßen vorgehen:

1. Versehen Sie den Sync-Eingangsanschluß (SYNC IN) mit einem Sync-Signal. Verwenden Sie dazu ein Sync-Signal oder ein BAS-Signal.
2. Stellen Sie den SYNC-Wahlschalter auf Extern (EXT) ein.
3. Drücken Sie die Wiedergabetaste (PLAY), um die Wiedergabe zu beginnen.

WIEDERGABE AUF EINEM FERNSEHEMPFÄNGER MIT EINEM HF-MODULATOR

Bei Benutzung eines zusätzlichen HF-Modulators ist der CP-5550E in der Lage, ein Band mit einem Fernsehempfänger abzuspielen. Um den HF-Modulator einzubauen, beraten Sie sich mit Ihrem JVC-Fachhändler.

Wenn Sie einen HF-Modulator zur Wiedergabe mit einem Fernsehempfänger benutzen, ist es nötig, den Kanalwähler des Fernsehempfängers auf den gleichen Kanal wie den des HF-Modulators einzustellen.

HF-Modulator Modell	Bestimmungsland	Kanal
KR-250EG	Europa Kontinent*	Kanal 43—47 auf dem UHF-Band nach dem Kontinental-Europa-Standard
KR-250EK	England	Kanal 43—47 auf dem UHF-Band Englischer Standard

* Außer Frankreich

Hinweis:

- Das HF-Modulator-Modell KR-250EG/EK kann auf die Känale 43 bis 47 eingestellt werden. Stecken Sie dazu einen Schraubenzieher in das Loch Nr. 3 des HF-Modulators. Eine Drehung im Uhrzeigersinn erhöht die Frequenz, auf die der Modulator abgestimmt ist.

WIEDERHOLTE WIEDERGABE

Mit der folgenden Bedienung kann das ganze Band, vom Anfang bis zum Ende, wiederholt werden.

1. Den AUTO MODE-Wahlschalter auf REPEAT stellen.
2. Zum Starten der Wiedergabe die PLAY-Taste drücken.

Wenn das Bandende erreicht wird, wird das Band automatisch zurückgespult und erneut wiedergegeben. Auf diese Weise kann das Band beliebig oft wiedergegeben werden.

RÜCKSPULEN UND BILDSUCHLAUF

- Die REW-Taste drücken. Das Band wird zurückgespult, und die Rückspul-LED-Anzeige leuchtet.
- Wenn die REW-Taste in der Stop-Betriebsart gedrückt wird, wird auf Rückspulen geschaltet. Wenn die REW-Taste bei der Wiedergabe oder in der Standbild-Betriebsart gedrückt wird, wird auf Rückwärts-Bildsuchlauf geschaltet.

SCHNELLVORLAUF UND BILDSUCHLAUF

- Die FF-Taste drücken. Das Band wird vorgespult, und die FF-LED-Anzeige leuchtet.
- Wenn die FF-Taste in der Stop-Betriebsart gedrückt wird, wird auf Schnellvorlauf geschaltet. Wenn die FF-Taste bei der Wiedergabe oder in der Standbild-Betriebsart gedrückt wird, wird auf Vorwärts-Bildsuchlauf geschaltet.

Hinweis:
Die Bildsuchlauf-Geschwindigkeit beträgt etwa das 15-fache der normalen Bandgeschwindigkeit. Wenn eine Fernbedienung (Sonderzubehör) verwendet wird, kann die Bildsuchlauf-Geschwindigkeit durch Drehen des Reglers der Fernbedienung stufenlos von Null bis zur 5-fachen Normalgeschwindigkeit eingestellt werden. Wenn dieser Regler ganz bis zum Anschlag gedreht wird, beträgt die Suchlauf-Geschwindigkeit das 15-fache der Normalgeschwindigkeit. Beim Suchlauf in beiden Richtungen kann das Bild wandern, wenn die Geschwindigkeit die 5-fache Normalgeschwindigkeit überschreitet.

ZÄHLWERK-SUCHLAUF

1. Das Zählwerk an der Bandstelle, von der ab das Band wiedergegeben werden soll, auf 00:00 zurückstellen.
2. Den AUTO MODE-Wahlschalter auf SEARCH stellen.
3. Zum Rückspulen oder Vorspulen des Bandes bis zu der Stelle, wo das Zählwerk zurückgestellt wurde, die REW- oder die FF-Taste drücken.
4. Wenn die Zählwerk-Position 00:00 erreicht wird, stoppt das Band automatisch, und das Gerät schaltet auf die Stop-Betriebsart.

Hinweis:
Das Band kann die Zählwerk-Position 00:00 manchmal um 3 bis 5 Sekunden überfahren.

AUTOMATISCHES RÜCKSPULEN

Wenn das Band bei Wiedergabe ganz abgelaufen ist, wird es automatisch zurückgespult, danach schaltet das Gerät auf die Bereitschafts-Betriebsart. Die Zählwerk-Suchlauf- und die Wiedergabe-Wiederholung-Funktion sind bei diesem automatischen Zurückspulen bedienbar.
Wenn das Band beim Schnellvorlauf ganz bis zum Ende gespult ist, schaltet das Gerät automatisch auf die Bereitschafts-Betriebsart.

BAND-ZU-BAND-KOPIEREN

1. Den Zuspieler und den Rekorder nach den Anweisungen auf Seite 36 miteinander verbinden.
2. Wenn Sie das Wiedergabegerät unter Synchronisation mit einem externen Sync-Signal antreiben wollen, müssen Sie den SYNC-Wahlschalter des Wiedergabegerätes auf Extern (EXT) einstellen.
3. Stellen Sie den SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO ein.
4. Stellen Sie den Eingangs-Wahlschalter des Aufnahmegerätes nach Bedarf ein.
   Leitung: Wählen Sie diese Einstellung für eine Band-zu-
   (LINE) Band-Kopie.
   Kopf-zu-Kopf-Kopie (FM DUB):
   Wählen Sie diese Einstellung für eine Kopf-zu-Kopf-Kopie.
   - Auch bei einer Kopf-zu-Kopf-Kopie muß der Video-Ausgang (VIDEO OUT) des Wiedergabegerätes mit dem Video-Eingang (VIDEO IN) des Aufnahmegerätes in der gleichen Weise wie bei einer Band-zu-Band-Kopie verbunden werden.
5. Schalten Sie das Wiedergabegerät auf Wiedergabebetrieb, und das Aufnahmegerät auf Aufnahmebetrieb.

KOPF-ZU-KOPF-KOPIEREN

Bei Video-Kassettenrekordern wird das Signal zuerst in ein frequenzmoduliertes Signal (FM-Signal) umgewandelt und dann auf das Band aufgenommen. Während der Wiedergabe wird dieses FM-Signal vom Band abgenommen und in das ursprüngliche Videosignal demoduliert. Wenn deshalb bestimmte Aufnahmen auf einem Band wiedergegeben und auf ein anderes Band neu aufgenommen werden (entweder für Kopieren oder Bildschnitt), geht folgender Prozess vor sich: Das Wiedergabegerät nimmt das FM-Signal vom Band ab, macht daraus durch Demodulation wieder das ursprüngliche Videosignal und übermittelt dieses Signal zum Aufnahmegerät. Dieses empfängt das Videosignal, wandelt es in das FM-Signal um und nimmt es auf das Band auf.

Beim Kopf-zu-Kopf-Kopieren überträgt das Wiedergabegerät das FM-Signal so, wie vom Band abgenommen, ohne Demodulierung, und das Aufnahmegerät nimmt das FM-Signal direkt auf das Band auf. Das bedeutet, daß bei dem Kopf-zu-Kopf-Kopieren keine Modulation und Demodulation stattfinden, so daß jede Bildverschlechterung, die durch diesen Prozeß bedingt ist, vermieden wird. Das Kopf-zu-Kopf-Kopieren ergibt daher bessere Kopien als die gewöhnliche Kopiermethode (Band-zu-Band-Kopieren).

Wesentlich ist sowohl für das Band-zu-Band-Kopieren wie auch für das Kopf-zu-Kopf-Kopieren, daß die Servovorrichtungen des Aufnahmegerätes mit dem aufzunehmenden Signal synchronisiert sind. Für diesen Zweck benützt das Band-zu-Band-Kopieren ein vertikales Sync-Signal, das vom Video-Eingangssignal als Referenzsignal für die Servovorrichtungen getrennt werden kann. Beim Kopf-zu-Kopf-Kopieren ist jedoch die Trennung des vertikalen Sync-Signals vom FM-Eingangssignal schwierig. Deshalb ist die Anwendung eines separaten Referenz-Sync-Signals notwendig. Für diesen Zweck können zwei verschiedene Methoden angewendet werden:

1. Speisen Sie das demodulierte Videosignal vom Wiedergabegerät (das Ausgangssignal am Videoausgang (VIDEO OUT) des Wiedergabegerätes) in den Videoeingang (VIDEO IN) des Aufnahmegerätes. In diesem Falle muß der SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO eingestellt sein.
2. Speisen Sie das gleiche externe Sync-Signal in den Sync-Eingang (SYNC IN) des Wiedergabe- und des Aufnahmegerätes. Der SYNC-Wahlschalter des Wiedergabe- und des Aufnahmegerätes muß in diesem Falle auf Extern (EXT) eingestellt sein.

VORSICHTSMASSNAHMEN FÜR VERWENDUNG IN EINEM SCHNITT-SYSTEM

Einstellung der Horizontalphase
Zum Schneiden mit verbesserter Genauigkeit ist der Rekorder mit einem Horizontalphasen-Regler ausgestattet, mit dem die H-Phase des Rekorders präzise mit der H-Phase des Zuspielers abgestimmt werden kann.

1. Den H-PHASE-Regler des Zuspielers auf die mittlere Einrastposition einstellen.
2. Den Rekorder auf die Insertschnitt-Betriebsart schalten.
3. Die Insertschnitte wiederholt starten und stoppen und dabei den H-PHASE-Regler des Rekorders drehen, bis die LED-Anzeige über dem H-PHASE-Regler leuchtet. Dies kann auch auf dem Monitorschirm (interner Sync-Monitor) überprüft werden, wo das horizontale Sync-Signal nicht mehr sichtbar ist, wenn die Horizontalphasen von Rekorder und Zuspieler perfekt aufeinander abgestimmt sind.

H-PHASE-Anzeige und H-PHASE-Regler
Die LED-Anzeige über dem H-PHASE-Regler dient gleichzeitig als Bildservo- und als Horizontalphasen-Anzeige. In Verbindung mit der Einstellung des FRAME SERVO-Schalters auf der Rückseite funktioniert diese LED-Anzeige auf die folgende Weise:

1. Wenn der FRAME SERVO-Schalter auf ON steht
   Die Anzeige leuchtet, wenn das Eingangssignal für den Schnitt die gleiche Horizontalphase wie das Wiedergabe-Videosignal hat. In der Praxis vor dem Schneiden den H-PHASE-Regler so einstellen, daß die Anzeige leuchtet.
   Hinweise:
   - Wenn kein Eingangssignal vorhanden ist, funktioniert der H-PHASE-Regler nicht, und die Anzeige erlischt.
   - Bei der Aufnahme und beim Schneiden funktioniert der H-PHASE-Regler nicht, wenn die Anzeige leuchtet.
2. Wenn der FRAME SERVO-Schalter auf OFF steht
   Die Anzeige leuchtet nicht, und der H-PHASE-Regler funktioniert nicht.

Synchronisation des Schnittservos
Unabhängig von der gewählten Schnitt-Betriebsart ist der Servo-Schaltkreis des Rekorders mit dem Eingangs-Videosignal oder dem externen Sync-Signal verriegelt.

Wurde der SYNC-Wahlschalter des Aufnahmegerätes auf VIDEO gestellt, so wird dessen Servoschaltung von den Wiedergabebedingungen des Wiedergabegerätes beeinflußt. Sollte z.B. das Wiedergabegerät auf Standbild oder Suchlauf eingestellt sein, so könnte das Wiedergabebild des Aufnahmegerätes (bei Betriebsart Wiedergabe) asynchron werden.

Um ein stabiles Wiedergabebild des Aufnahmegerätes zu erhalten, empfiehlt es sich, das Wiedergabegerät auf Stop oder Wiedergabe (wenn das Band auf dem Wiedergabegerät normale Aufnahmen enthält) einzustellen oder benutzen Sie ein externes Synchronsignal, indem Sie den SYNC-Wahlschalter auf EXT stellen.

Das Referenz-Sync-Signal für die Servo-Systeme bei Aufnahme und Wiedergabe ist unterschiedlich, abhängig von der Einstellung des SYNC- und des INPUT-Wahlschalters, und abhängig von dem Signal, das an den Eingangsbuchsen anliegt.

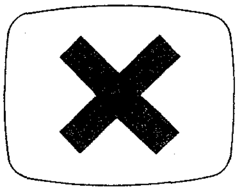
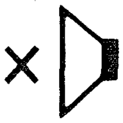
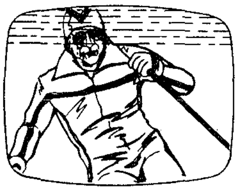
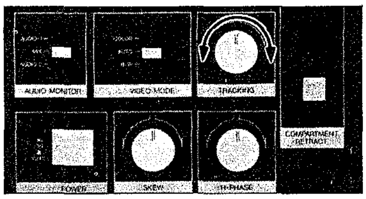
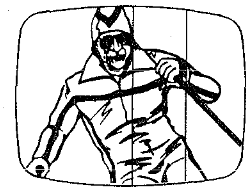
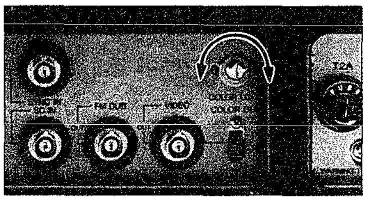
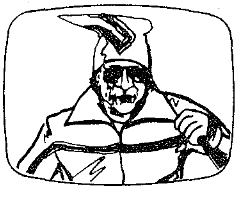
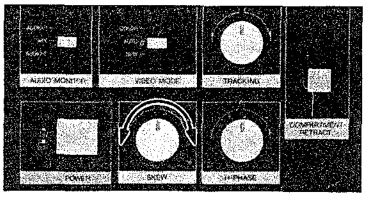
FRAME SERVO-Schalter
Wenn beim Band-zu-Band-Kopieren Bänder mit einem schlechten Wiedergabebild-Störspannungsabstand verwendet werden, können bei Kopien von mehr als drei Generationen und bei Bändern, die mit Cameras mit ungeeigneten Zeilensprung-Standards aufgenommen oder mit Schnitt-Geräten anderer Hersteller geschnitten wurden, an den Schnittpunkten Bildverzerrungen auftreten. Dies beruht auf einer Fehlfunktion des Bildservos. Um dies zu vermeiden, den FRAME SERVO-Schalter auf OFF stellen.

Monitor-Synchronisation in der Standbild-Betriebsart und in den Suchlauf-Betriebsarten
Das Wiedergabe-Videosignal enthält einen vertikalen Sync-Impuls (V-Impuls), so daß das Monitorbild auch beim Standbild und beim Suchlauf synchronisiert bleibt. Wegen dieses Impulses kann bei Verwendung von Monitoren anderer Hersteller die horizontale Synchronisation teilweise verloren gehen (der obere Teil des Bildes kann verzerrt sein). Wenn dies vorkommt, den Stecker P129 (STILL PULSE) der Vorverstärker-Schaltplatte ziehen. (Wenden Sie sich für Einzelheiten an einen JVC-Händler.)

- Wenn der STILL PULSE-Stecker entfernt ist, kann die horizontale Synchronisation unstabil werden, abhängig von der Position der Störzeilen.

Wir empfehlen die Verwendung externer Synchronisation
Die externe Synchronisation (EXT SYNC) stabilisiert das gesamte Servo-System und erzeugt dadurch stabilere Wiedergabebilder. Deshalb empfehlen wir die Verwendung externer Synchronisation, wann immer es möglich ist.

STÖRUNGSSUCHE

Symptome	Bitte prüfen Sie	Bemerkungen
Kein Bild, Kein Ton  	• Nachprüfen, ob der VTR/TV-Schalter des Fernsehmonitors auf VTR eingestellt ist. Wenn nicht, auf VTR stellen.	• Beziehen Sie sich für weitere Einzelheiten auf die Bedienungsanleitung des Fernsehmonitors.
Störzeilen oder verwaschenes Bild 	• Überprüfen, ob der TRACKING Regler nicht in der Mitte steht. • Den TRACKING-Regler langsam drehen, bis das Bild klar wird.  AUDIO MONITOR VIDEO MODE TRACKING COMPARTMENT RETRACT POWER SKEW H-PHASE	• Nach Wiedergabe des Bandes diesen Regler wieder auf die mittlere Einrast-Position einstellen.
Monochrom-Bild, falscher Farbton oder Farbstreifen 	• Den COLOR LOCK-Regler langsam drehen, bis die richtigen Farben erzielt werden.  FM DUB VIDEO COLOR LOCK T2A	• Die Farbe, der Farbton, die Helligkeit und der Kontrast können nicht mit diesem Regler eingestellt werden. • Nach der Wiedergabe des Bandes diesen Regler wieder auf die mittlere Einrast-Position einstellen.
Schrägverzerrung – oberer Bildteil ist horizontal verzerrt 	• Die Verzerrungen mit dem SKEW-Regler korrigieren. • Zuerst den Vertikal-Bildfangregler des Fernsehers so einstellen, daß der Bildrand (die der Austastlücke entspricht) sichtbar ist, und dann den SKEW-Regler langsam in eine der beiden Richtungen drehen, bis die leichte Verbiegung dieses Bildrandes korrigiert ist.  AUDIO MONITOR VIDEO MODE TRACKING COMPARTMENT RETRACT POWER SKEW H-PHASE	• Während der Aufnahme den SKEW-Regler nicht drehen. • Nach der Wiedergabe des Bandes diesen Regler wieder auf die mittlere Einrast-Position einstellen.

TECHNISCHE DATEN

ALLGEMEIN

Spannungsversorgung : 110/127/220/240 V∿, ±10 % 50/60 Hz, 105 W (max. 115 W mit der Schnittsteuereinheit RM-88U)

Abmessungen : 56,4(B) x 22,1(H) x 47,1(T) cm

Gewicht : 30,6 kg

Betriebstemperatur : 5°C bis 40°C

Betriebslage : Nur horizontal

Bandgeschwindigkeit : 9,53 cm/sek.

Aufnahmezeit : Max. 60 Minuten mit JVC KCA-60

Schnellvorlauf/Rückspul-Zeit : Innerhalb von 4 Minuten 30 Sekunden für 60-Minuten-Band

Gleichlaufschwankungen : Weniger als 0,15 % RMS

VIDEO

Wiedergabesystem : Rotierendes Zweikopfsystem mit Schrägspurabtastung

Videosignalsystem : PAL-Farbsignal, 625 Zeilen (CCIR-Standard)

Ausgänge Line/TV : 1,0 Vs-s, 75 Ohm

Kopf-zu-Kopf-Kopieren : 0,5 Vs-s, 75 Ohm

Störspannungsabstand : Mehr als 46 dB (Farbe), Mehr als 48 dB (schwarz/weiß) (Rohde & Schwarz Störspannungsmesser)

Horizontale Auflösung : Monochrom 330 Zeilen, Farbe 250 Zeilen

Hilfsträger-Eingang : 2,0 Vs-s, 75 Ohm

Sync-Eingang : 0,5 bis 4,0 Vs-s, 75 Ohm

Videobetriebsart-Wahl : COLOR/AUTO/BW

Sync-Wahl : EXT/INT

AUDIO

Ausgänge Line : –20/0 dBs, niederohmig, symmetrisch

Monitor : 0 dBs, niederohmig, symmetrisch

Kopfhörer : –28 dBs, 8 Ohm, unsymmetrisch

TV : 0 dBs, niederohmig, unsymmetrisch

Störspannungsabstand : Mehr als 48 dB (bei 3 % Klirrfaktor)

Frequenzgang : 50 bis 15.000 Hz

Monitor-Ausgangswahl : CH-1/MIX/CH-2

ANSCHLÜSSE

HF-Ausgang : Antennenanschluß

Video-Ausgang : BNC

Kopf-zu-Kopf-Kopieren-Ausgang : BNC

Sync/Hilfsträger-Eingang : BNC

Audio Line-Ausgang : XLR

Monitor-Ausgang : XLR

Kopfhörer : 6-mm-Klinke

TV-Ausgang : EIAJ 8-pol. TV-Anschluß

Netzeingang : 3-adriger Anschluß

Fernbedienung : 45-pol. Anschluß

ZUBEHÖR : Monitorkabel Bedienungsanleitung

SECTION 1
TECHNICAL DESCRIPTION

1.1 DISTINGUISHING FEATURES

The main technical features of this system are as follows.

1. Direct drive system in which separate motors are used for the head drum, capstan and each of the reels.
2. Rugged and reliable diecast alloy transport.
3. Built-in 4-bit microcomputer which is programmed to control a total of 7 motors, in addition to the editing functions.
4. FM to FM dubbing system for improved picture quality during dubbing operations.
5. By using the remote control unit, shuttle search operation allows continuously variable tape speed in both forward and reverse directions.
6. Recording and playback of time code signals are possible.
7. The Series enables fast forwarding and rewinding of the tape in the loading position, adding flexibility to the machine performance.
8. Drastically increased speed of tape position search from the conventional 5 times to 15 times the normal tape speed at playback or recording.
9. Increased service life of the video head as the head material has been changed to moulded glass.
10. Three different Models provide flexibility and match a wide variety of systems.

1.2 COMPOSITION AND FUNCTION

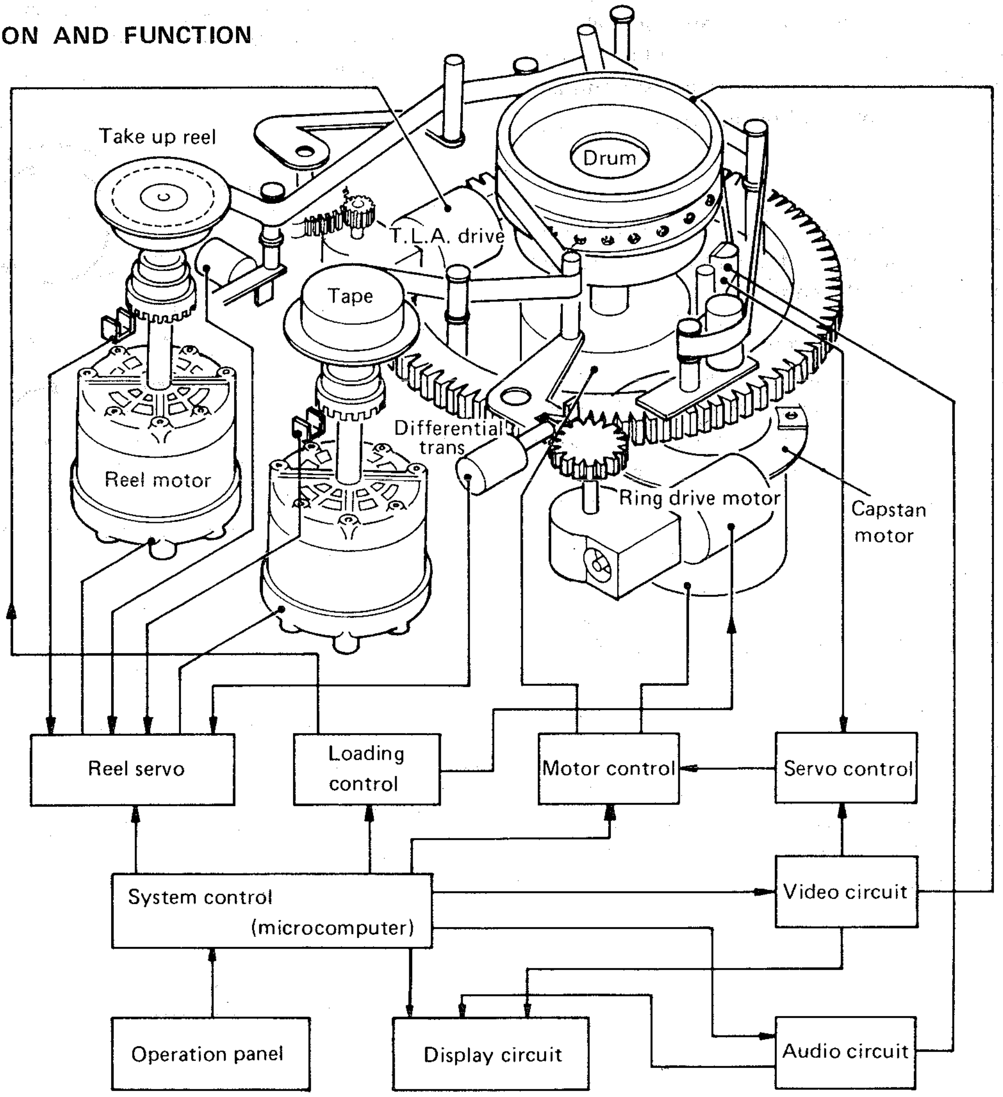

Take up reel
Drum
T.L.A. drive
Tape
Reel motor
Differential trans
Ring drive motor
Capstan motor
Reel servo
Loading control
Motor control
Servo control
System control (microcomputer)
Video circuit
Operation panel
Display circuit
Audio circuit

Fig. 1-1

1. Loading system
   In this series, the tape loading and unloading operations are further subdivided into draw, loading, unloading and store. Loading of a cassette initiates a series of loading actions in which the loading arm extracts the tape from the cassette and sets it in the drive system. This places the machine in Stop mode, allowing the tape to be selectively fast forwarded or rewound.

   Selection of play or record mode then initiates the loading operation, by which the tape is further extracted from the cassette and wrapped about the head drum.

   Conversely, the unloading operation disengages the tape from the head drum and partially returns it to the cassette, again enabling Fast Forward and Rewind. From this point, the store operation returns the tape completely to the cassette, after which the cassette can be ejected. The Eject system uses an electrically driven cassette housing elevator.
2. Reel drive servos
   During Play, the tape must be transported with the proper back tension and taken up with the proper take-up torque. These functions are controlled by the reel servo circuits. Tape speed (x 15) is detected by capstan drive for each reel. Thus, smooth and stable tape transport is obtained from low to high speeds.
3. Capstan and frame servos
   The capstan servo system permits high precision electronic editing, while the frame servo enables frame alignment at the editing point.
4. System control (microcomputer)
   A single microcomputer is programmed for all functions, including loading, Play, Fast Forward, Rewind, timing control for editing, auto rewind, repeat, etc. By employing the microcomputer, the reduced quantity of individual parts enhances reliability.
5. Video circuit
   This circuit processes the video signal for recording and playback with magnetic tape. An FM-FM dubbing system is included which aids in maintaining picture quality during editing and dubbing.
6. Audio circuit
   In principle, the same as an audio cassette tape recorder. Since two audio tracks are used, this circuit consists of two lines.

1.3 MECHANICAL OUTLINE

After insertion of a cassette into the cassette compartment, a final light push will fit the cassette into the correct position in the compartment.
The cassette, upon being positioned in the compartment will allow the tape to be extracted into a state half way to loading mode. When the cassette is in this state, the machine is in the Draw mode. At this moment, the tape end detector which senses the tape end will bring the drive system to fast forward or rewind of the tape until the transparent tape portion reaches a point just past the detector. After completion of this fast forwarding or rewinding, the machine is set for loading function. With the tape engaged in the drive system, the machine will repeat necessary actions similar to those performed in the Draw position, until it enters the Stop mode. The loading position of the tape allows fast forwarding or rewinding operation.

Pressing the PLAY button brings the machine into Playback mode, putting the pinch roller into contact with the capstan. The take-up reel and supply reel are driven by separate reel motors. When the machine is in the loading position, operation of the unloading motor brings the tape back into the Draw mode. This is done by pressing the EJECT button. Then the tape is pushed back into the cassette.

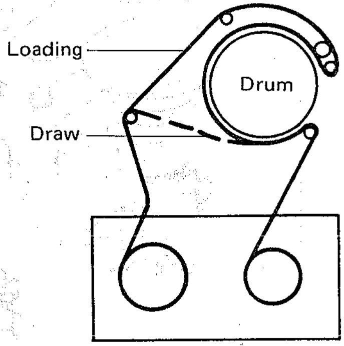


Fig. 1-2 Draw complete

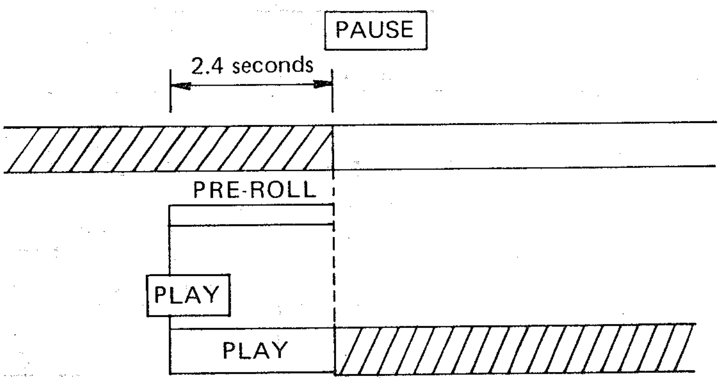


Fig. 1-3 Preroll

Pause and Still:

Simultaneously pressing the RECORD and PLAY buttons during the Play mode produces the Recording mode. When the PAUSE button is pressed during the Record mode, approx. 2.4 seconds of tape becomes rewound, then the Pause (Still) mode is obtained. This rewind takes about 4 seconds.

The machine is factory-set to carry out this tape rewinding for 2.4 seconds. The internal switch provides adjustment of the rewound length to 0.5, 3 or 5 seconds according to the demand of the user.

In the Pause mode, by again pressing the PLAY button, the 2.4 seconds of tape is played back, then the Record mode resumes. This operation (preroll) serves to avoid disturbance at the transition between recording segments (editing point).

When the STILL button is pressed during the Play mode, the capstan motor stops, and the tape transport stops.

Tape tension:

Supply voltage to the reel motors controls the tape tension during Play. Tension roller mechanically detect the tape tension, while differential transformers convert the tension roller positions into electrical values. The reel servo circuits then control the reel motors according to the outputs of the differential transformers.

1.4 SIGNAL SYSTEM

Video signal system outline

The composite television signal consists of three main components: luminance (or "Y") which conveys picture brightness information, color (or chroma) for transmitting color information, and synchronization (or "SYNC") which correlates the functions of the picture source and receiver. A video cassette recorder (VCR) utilizes rotating video heads to record these signal components onto magnetic tape.

Among the three components, the luminance and sync signals are characterized by comparatively high frequencies that vary rather broadly. These signals are frequency modulated and recorded on the tape as FM signals.

In the PAL (phase Alternating Line) television system, a 4.43 MHz chroma signal is employed. This signal is converted to a low frequency of 686 kHz prior to recording on tape.

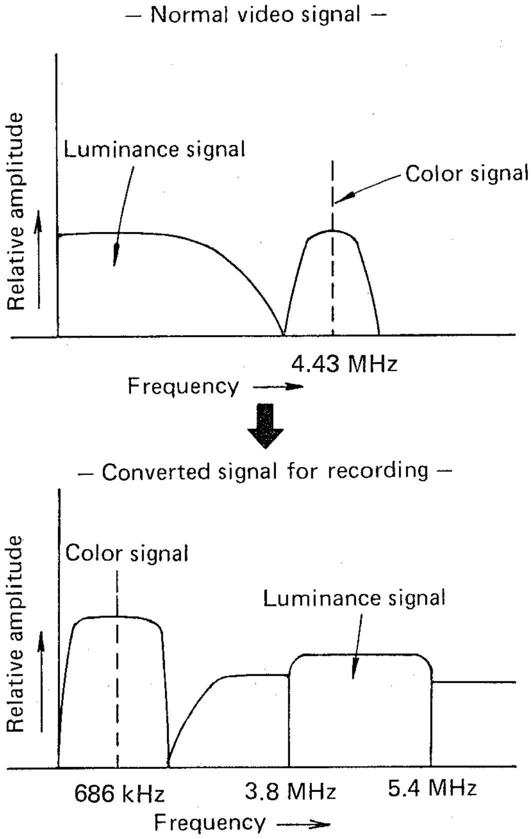


Fig. 1-4 Color conversion

The video signal conveys picture brightness information by increasing and decreasing voltage, and thus can be thought of as an AM signal. If the signal were recorded directly in this form, inherent aberrations in the VCR system (such as nearly continuous variations in tape sensitivity, tape to head contact, elasticity of the tape, etc.) would distort the signal too strongly to retain usable picture quality. For this reason, the luminance signal is converted to an FM signal before recording, thereby avoiding the adverse effects of amplitude variations in the record/playback system.

In general, the following tape to head relationships have been established.

1) As the recording frequency increases, the wavelength recorded on the tape becomes shorter.
2) A narrower head gap allows playback of higher frequencies.
3) Higher relative speed between tape and head allows longer wavelength recording.

Above properties 1 and 3 can be expressed by the formula:

$$\lambda = \frac{\nu}{f}$$

λ : Recorded wavelength
ν : Relative speed
f : Recorded frequency

The recording frequency with a VCR is about 4 MHz and the relative tape to head speed approximately 10 meters per second. Therefore, the recording wavelength becomes in the area of 2.5 μm.

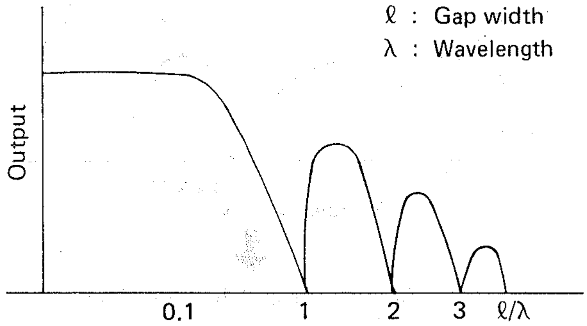


Fig. 1-5 Gap VS. output

During playback, the playback voltage is obtained by variations in magnetic flux from the tape. At the point where the head gap width and recording wavelength are equal, the output ceases. This condition is illustrated in Fig. 1-5.

The head gap with a VCR is about 0.8 μm, and by using the formula, the output becomes zero at approx. 12.5 MHz. In practive, however, since various other losses are also incurred, the limit of usable output becomes 6 to 8 MHz.

The luminance signal is frequency modulated between 3.8 and 5.4 MHz. High frequency noise affects FM signals more strongly than low frequency noise. For this reason, a pre-emphasis circuit enhances the high frequency component of the video signal prior to modulation. During playback, a de-emphasis circuit retores this component to its normal level. A clipping circuit limits the amplifier in order to prevent over-driving the FM modulator from the pre-emphasized signal. Fig. 1-7 shows the block diagram of the luminance signal system.

In the PAL system, the reference color burst signal must be extremely accurate at 4.43 MHz ± 500 kHz. Deviation of this signal frequency causes color loss. With a VCR, the head to tape relatice speed during recording versus the relative speed during playback already exceeds the acceptable margin of error for the color signal frequency. Furthermore, the expansion and contraction fo the tape due to temperature also contribute significantly to the frequency error.

The first step in surmounting this problem is to reduce the color frequency from its approx. 4.43 MHz to 686 kHa (a value which also takes into consideration such factors as color bandwidth and frequency interleaving). This has the advantage of reducing the absolute value of the frequency fluctuation (1% of 4 MHz is 40 kHz, while 1% of 700 kHz becomes 7 kHz). The residual error (Δf) is then cancelled by the following process.

Two loops are employed: APC (automatic phase control) and AFC (automatic frequency control). In the APC loop, an internal crystal oscillator produces stable 4.43 MHz. This is mixed with the playback color signal (686 kHz ±Δf) to yield 5.12 MHz ±Δf. When again mixed with the playback color signal, 4.43 MHz results. A phase detector compares this 4.43 MHz with that of the crystal oscillator and the difference (the ±Δf component) is applied to the APC VCO (voltage controlled oscillator). The output of the VCO varies in the area of 279.29 kHz.

In the AFC loop, the AFC VCO produces 406.25 kHz, which is divided 1/26th to 15.625 kHz. The phase of this signal is compared with that of the horizontal sync component (15.625 kHz ± Δf) played back from the tape.

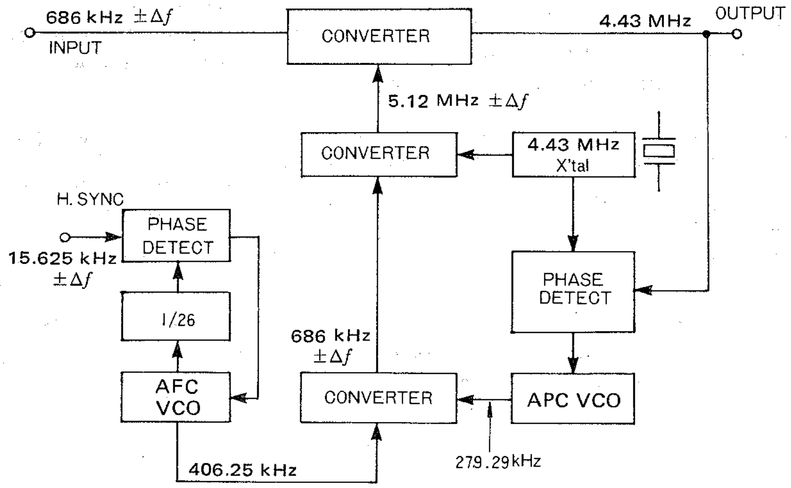


Fig. 1-6 APC and AFC loops

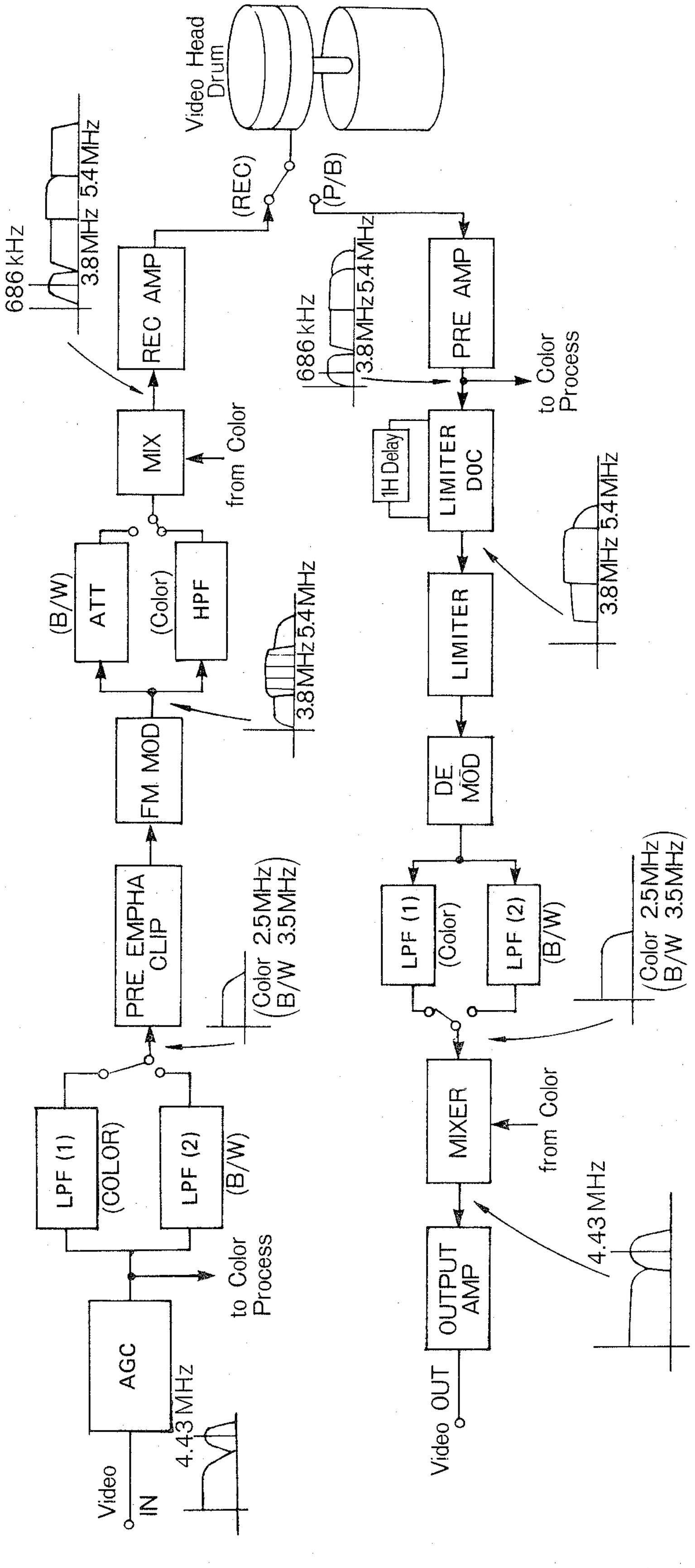

Video IN
4.43 MHz
AGC
to Color Process
LPF (1)
(COLOR)
LPF (2)
(B/W)
PRE EMPHA CLIP
(Color 2.5MHz
B/W 3.5MHz)
FM MOD
3.8MHz 5.4MHz
(B/W)
ATT
(Color)
HPF
MIX
from Color
REC AMP
686 kHz
3.8MHz 5.4MHz
(REC)
(P/B)
Video Head Drum
PRE AMP
686 kHz
3.8MHz 5.4MHz
to Color Process
1H Delay
LIMITER DOC
3.8MHz 5.4MHz
LIMITER
DE MOD
LPF (1)
(Color)
LPF (2)
(B/W)
(Color 2.5MHz
B/W 3.5MHz)
MIXER
from Color
4.43 MHz
OUTPUT AMP
Video OUT

Fig. 1-7 Signal processing system

In turn, the difference voltage is applied back to the VCO to vary its output frequency.

The varying 406.25 kHz from the AFC VCO is added to the varying 279.29 kHz from the APC VCO to yield 686 kHz. This is combined with the 4.43 MHz from the crystal oscillator to become 5.12 MHz ±Δf, thus completing the loop. As this is a continuous feedback process, the ±Δf component becomes continuously monitored and compensated, yielding a clean 4.43 MHz output.

FM Dubbing

A complete tape program is seldom recorded all at once. More common is to record several segments, then edit them onto the final tape. However, every time a tape is copied (dubbed) the picture signal to noise ratio (S/N) deteriorates. With a home type VTR, the picture quality becomes unusable after only about 2 or 3 generations.

One of the main reasons for this is that during dubbing, the signal usually has to go through all the electrical circuits of two machines. Therefore, this series VCR includes an FM dubbing feature which allows dubbing by using only the minimum required circuit path, thereby permitting more generations of usable copies.

The main features of the signal system in this series VCR are as follows.

1) FM dubbing capability
2) Different video bandwidths for color and monochrome
3) Newly designed color playback circuit
4) Dubbing switch also allows dubbing with earlier model VCRs.

When set for the FM dubbing mode, the head amplifier input is switched from the normal recording amplifier to the dubbing circuit. The FM dubbing output consists of the FM luminance signal taken from the Y signal processor (following dropout compensation) and the 686 kHz color component taken following the ACC (automatic color compensation) circuit.

In the FM dubbing mode, the E-E video signal becomes the FM dubbing input, instead of the video input.

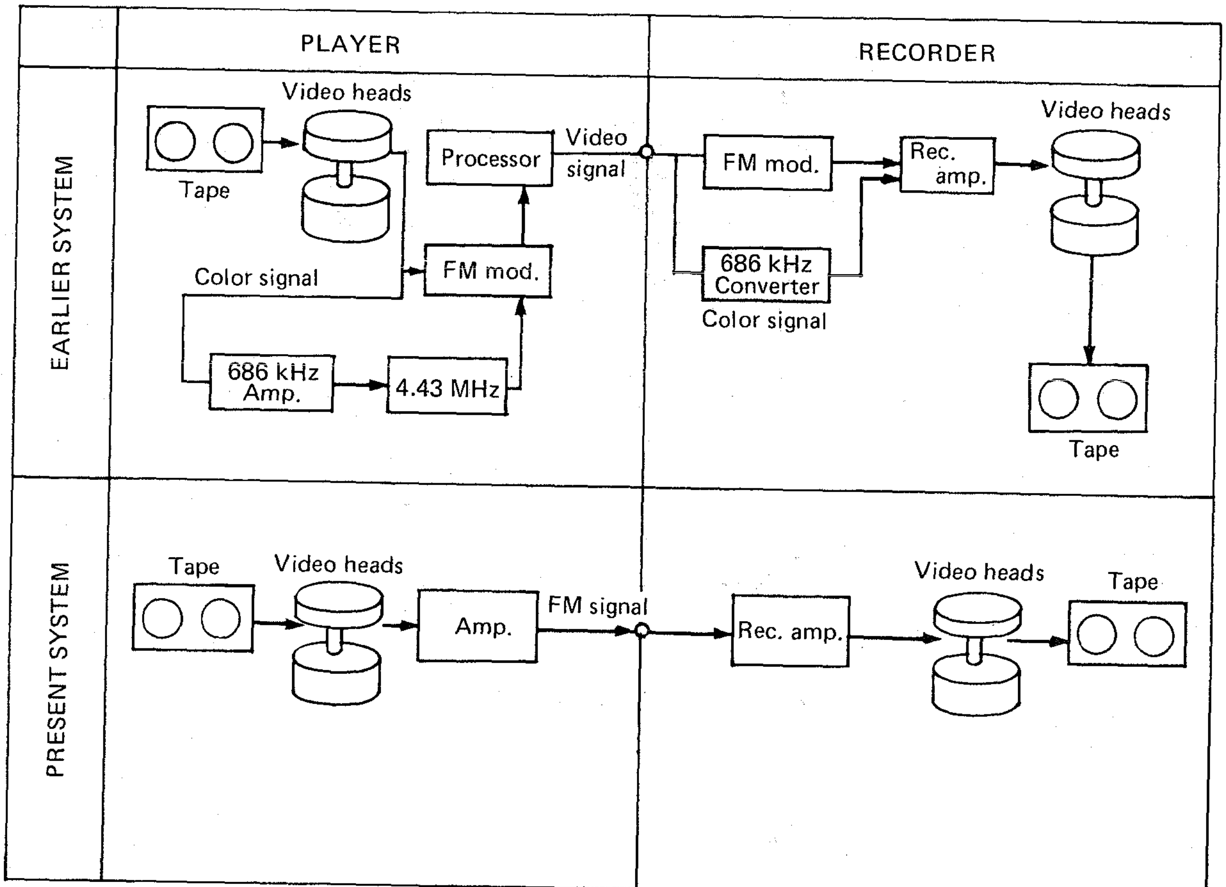

PLAYER
RECORDER
EARLIER SYSTEM
Video heads
Tape
Processor
Video signal
Color signal
FM mod.
686 kHz Amp.
4.43 MHz
FM mod.
Rec. amp.
686 kHz Converter
Color signal
Video heads
Tape
PRESENT SYSTEM
Tape
Video heads
Amp.
FM signal
Rec. amp.
Video heads
Tape

Fig. 1-8 FM dubbing principle

SECTION 2
MECHANICAL DESCRIPTION

2.1 MECHANICAL DESCRIPTION

2.1.1 Main mechanical parts and function

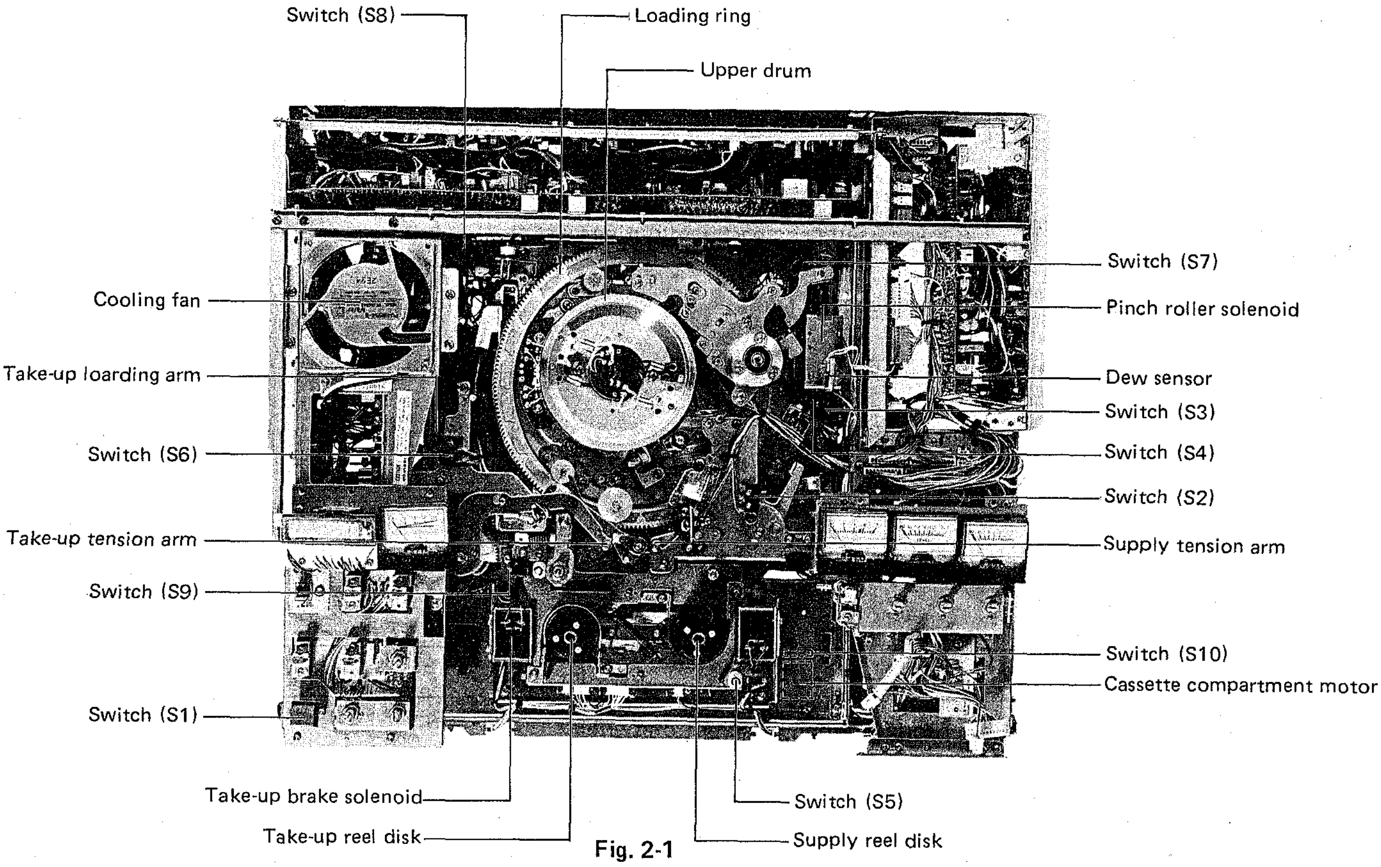

Switch (S8)
Loading ring
Upper drum
Switch (S7)
Pinch roller solenoid
Cooling fan
Take-up loarding arm
Dew sensor
Switch (S3)
Switch (S6)
Switch (S4)
Switch (S2)
Take-up tension arm
Supply tension arm
Switch (S9)
Switch (S10)
Cassette compartment motor
Switch (S1)
Take-up brake solenoid
Switch (S5)
Take-up reel disk
Supply reel disk

Fig. 2-1

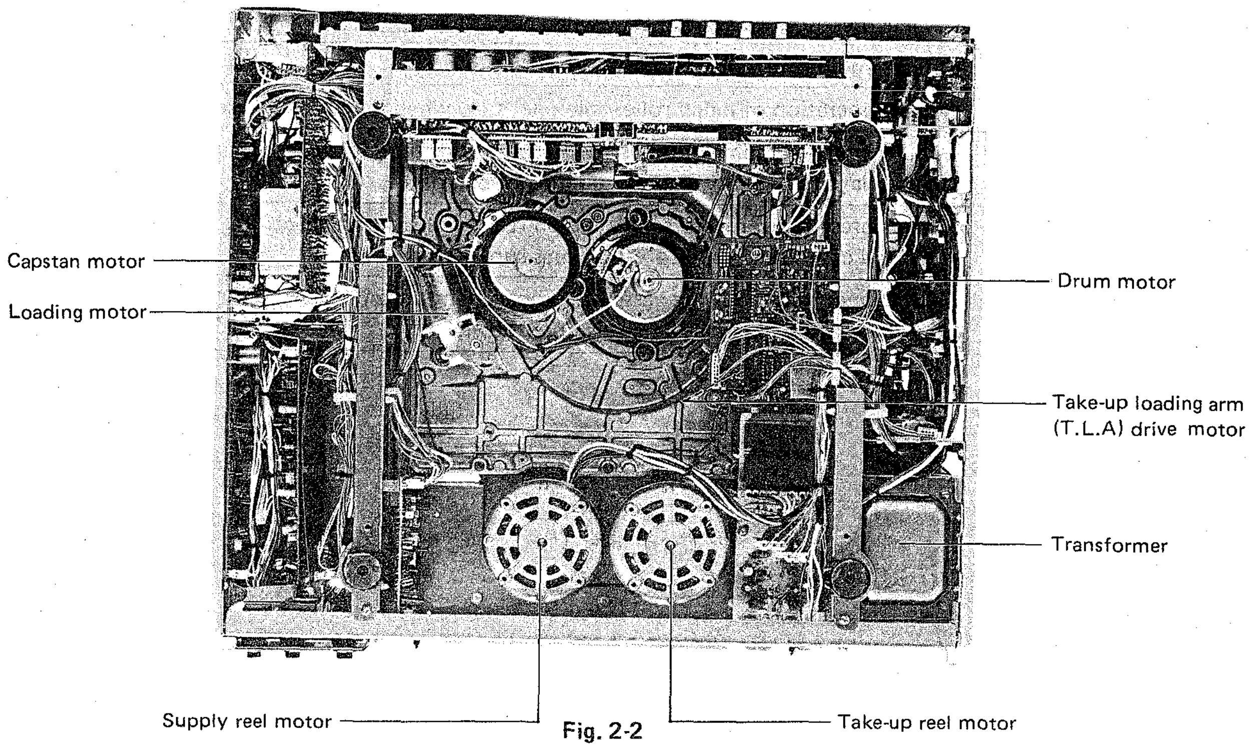

Capstan motor
Drum motor
Loading motor
Take-up loading arm
(T.L.A) drive motor
Transformer
Supply reel motor
Take-up reel motor

Fig. 2-2

1. Drive Sources

	Name	Purpose	Type
1	Drum motor	Video head drum rotation	Outer rotor brushless DC motor
2	Capstan motor	Drives capstan for transporting video tape at fixed speed.	"
3	Reel motors (2)	Supply and take-up reel disk rotation.	Single phase AC induction motors
4	Loading motor	Rotates loading ring for wrapping tape about drum.	DC motor
5	Take up loading arm drive motor	Extracts tape during loading.	"
6	Cassette compartment motor	Raises cassette compartment during eject.	"
7	Cooling fan motor	Rotates cooling fan.	AC motor
8	Pinch roller solenoid	Pinch roller and capstan pressure during.	Solenoid plunger
9	Brake release solenoid (2)	Releases reel disk brakes.	"

2. Microswitch Functions

Switch Name		Function
S1	Power switch	Power source switch, push-button switch.
S2	Store end switch	Detects end of store operation. Low at end of store.
S3	Unloading end switch	Detects whether the loading ring has returned fully. Low at unloading end.
S4	Loading end switch	Detects whether the loading ring has rotated to maximum extent. Low at end of loading.
S5	Cassette switch	Detects presence of cassette. Low when cassette is inserted.
S6	Draw end switch	Detects end of draw operation. Low at draw end.
S7	Pinch roller switch	Detects operation of pinch roller solenoid. Low when pinch roller disengages.
S8	Loading end zone switch	Turning on the loading end zone switch activates the supply tension roller, improving the playback quality at the beginning of playback.
S9	Record safety switch	Detects presence of record safety tab on rear of cassette package. When red cap is present, +24 V becomes supplied.
S10	Cassette compartment switch	Detects one rotation of the cassette compartment motor gear. Low when cassette compartment is up or down.

3. Draw and Store
   After turning on the power switch, insertion of a cassette into the cassette compartment initiates automatically a series of loading actions including extraction of the tape from the cassette to set it into the drive system, which then places the machine into Stop mode. This action of drawing out the tape from the inserted cassette is called "draw function". Conversely, the term "store" means retraction of the extracted tape back into the cassette.

4. Draw mechanism
   The STA and TLA begin moving when a cassette is inserted. After drawing out the tape, the Draw mode is obtained. This is shown in Fig. 2-3.

   When a cassette is present, the data are stored by microswitch S5. See Fig. 2-4. At the point the information is received, the reel disk brake solenoid functions to release both the supply and take-up reel brakes, at which time, the supply reel motor rotates to apply tape tension.

   The TLA drive motor rotates in the forward direction, driving the SLA drive assembly at point ⓐ. Via the connecting plate, the STA driver turns and drives the ST arm. See Fig. 2-5 & 2-6. Tape draw begins first from the supply side.

   As the SLA drive rotates further, the stud atop the SLA drive contacts the lower stud of the TLA drive ⓑ. Together with the TL arm, the TLA drive starts moving forward the left. Fig. 2-5(B).

   When the gear of the SLA drive nears the right end, the gear of the TLA drive begins to engage at the left end. The roller of the lock arm drive rides up on the TLA drive cam and the EL arm, which is connected to the rod, locks the STA drive cam ⓒ. The stud of the STA driver plate presses point ⓓ and fixes the STA driver. Supply back tension is determined by reel servo operation and this locking determines the reference position of the fixed side of the damper. Fig. 2-5(C) & (D).

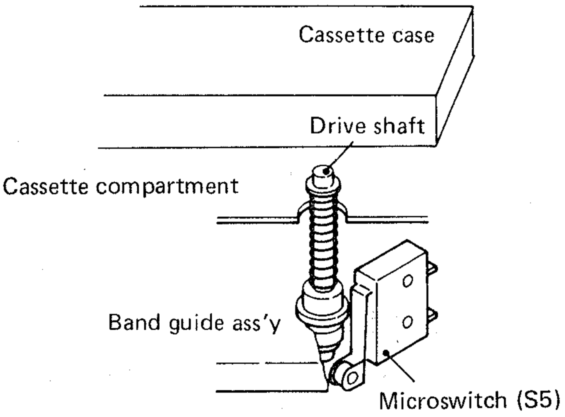


Fig. 2-3

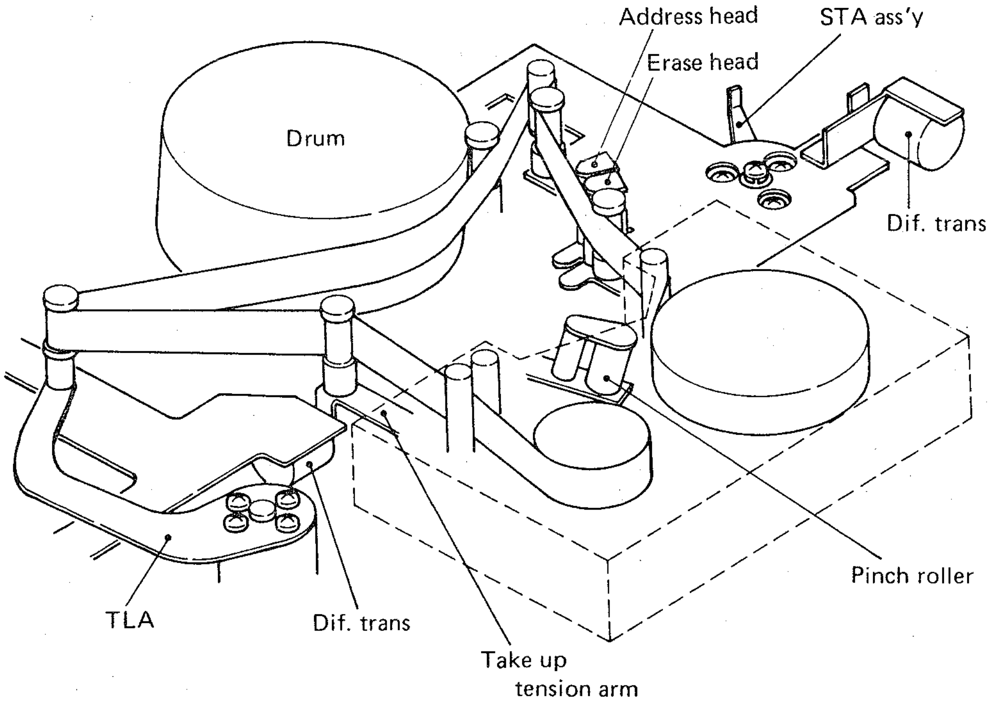


Fig. 2-4

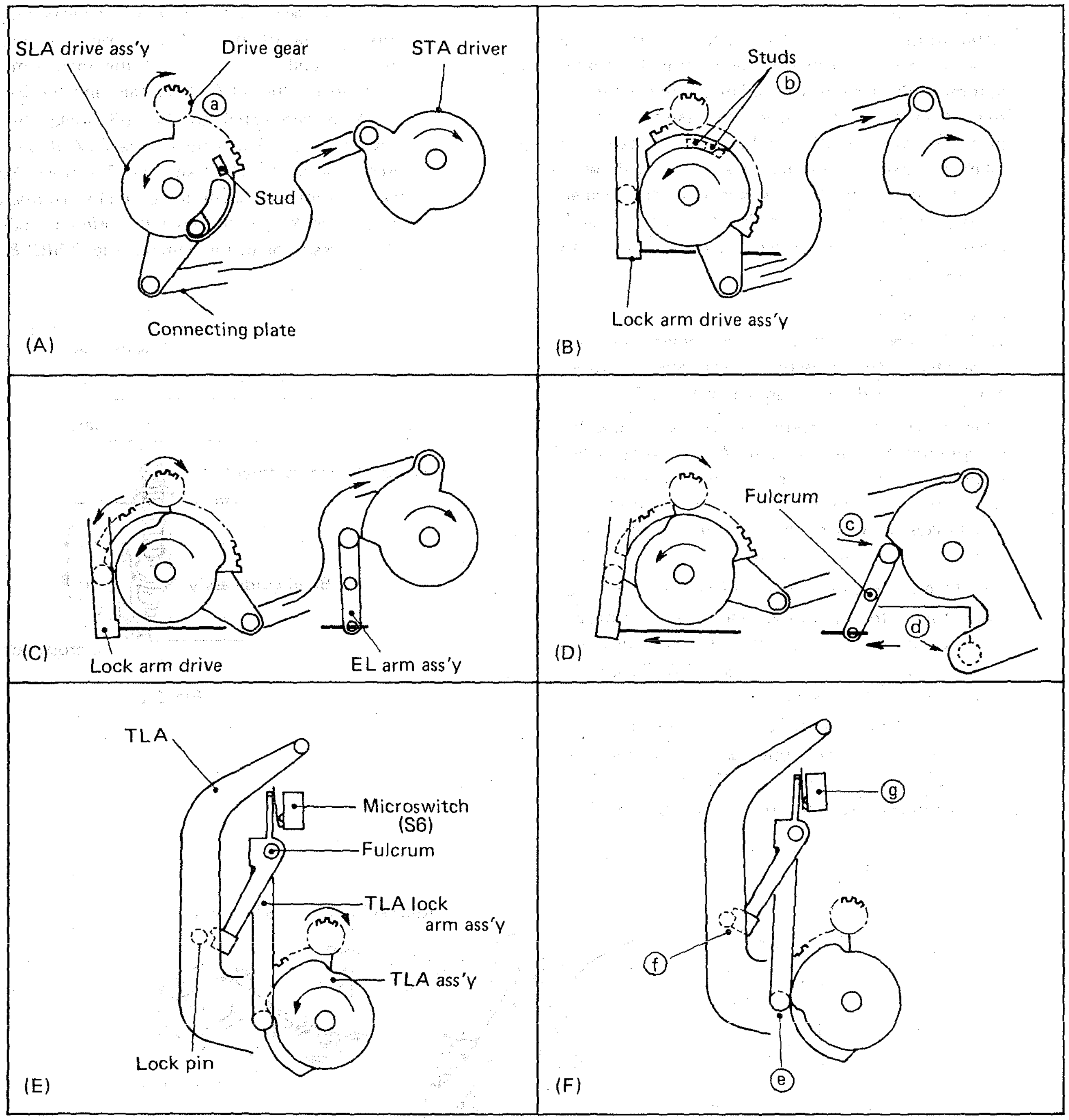

SLA drive ass'y
Drive gear
STA driver
ⓐ
Stud
Connecting plate
(A)
Studs
ⓑ
Lock arm drive ass'y
(B)
Lock arm drive
EL arm ass'y
(C)
Fulcrum
ⓒ
ⓓ
(D)
TLA
Microswitch
(S6)
Fulcrum
TLA lock
arm ass'y
TLA ass'y
Lock pin
(E)
ⓖ
ⓕ
ⓔ
(F)

Fig. 2-5

Further rotation of the TLA drive causes cam (e) to contact the TLA lock arm assembly, fixing the TL arm lock pin (f) and preventing TLA movement in all modes. At this time, the draw end switch S6 stops the TLA drive motor. Fig. 2-5 (E) & (F).

5. Store mechanism

The Store mechanism works to retract the extracted portion of the tape, after it has been drawn out from the drive system, into the cassette which is then elevated, in the cassette compartment, by means of a lifting system, into an ejecting position, at which the cassette may be taken out of the machine.

Pressing the UNLOADING switch S3 activates the solenoids to release the brakes on the take-up and supply reels, causing the reel motor to run.

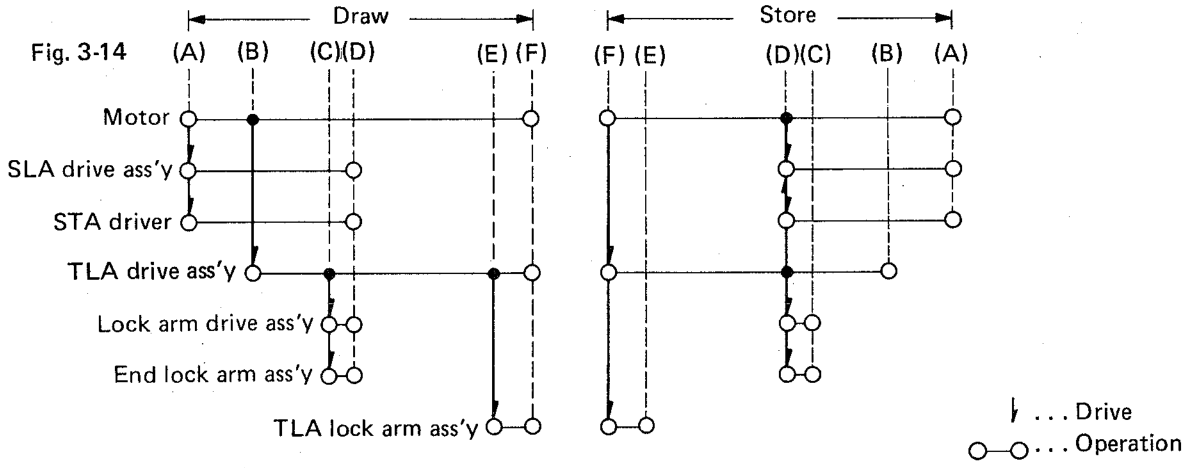

Draw
Store
Fig. 3-14
(A)
(B)
(C)
(D)
(E)
(F)
Motor
SLA drive ass'y
STA driver
TLA drive ass'y
Lock arm drive ass'y
End lock arm ass'y
TLA lock arm ass'y
... Drive
... Operation

Fig. 2-6

At the same time, the TLA drive motor rotates in reverse and the above-mentioned draw mechanism begins operating in reverse.

When the TL arm approaches the end of the store mode, the spring of the drive arm assembly returns it to the original position (position before draw start) where it stops.

When the STA ass'y returns fully to its original position, store end switch S2 becomes on, the TLA drive motor stops, reel motor rotation stops, and the brake release solenoid becomes off. Fig. 2-6 summarixes thes operations.

6. Cassette compartment Elevation mechanism

   The cassette is properly set into position in the cassette compartment, by further pushing on the cassette body after insertion into the compartment. This final push moves the cassette a little further into the compartment, causing the sliding plate to slide along the guide plate groove in the cassette compartment, as shown in Figs. 2-9 and 2-10.

   The lowering of the guide roller of the sliding plate full way down the guide plate vertical groove completes the cassette loading.

   A damper holder assembly is provided to maintain a constant speed of lowering of the cassette as it is being inserted into the loaded position.

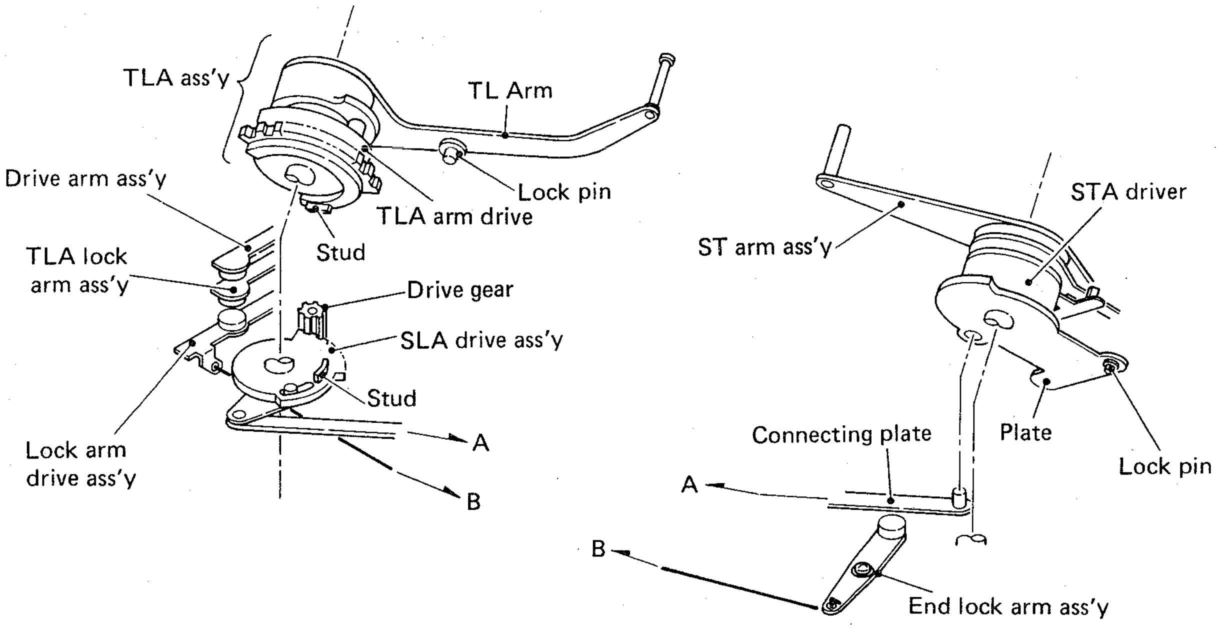

TLA ass'y
TL Arm
Drive arm ass'y
Lock pin
TLA arm drive
Stud
TLA lock arm ass'y
Drive gear
SLA drive ass'y
Stud
Lock arm drive ass'y
A
B
ST arm ass'y
STA driver
Connecting plate
Plate
Lock pin
A
B
End lock arm ass'y

Fig. 2-7

It is also possible to lower the cassette compartment without inserting a cassette. In this case, the compartment is lowered by pressure of the slide lever against the guide roller of the sliding plate. See Fig. 2-9.
However, with a cassette, operating the slide lever only does not provide proper insertion.

- **Removing the cassette**

The cassette compartment motor must rotate in order to raise the cassette compartment. When the motor turns, a cam releases the lock arm ass'y and a gear raises the cassette compartment. In the raised position, a cam on the gear contacts cassette compartment switch S10, stopping the compartment motor. See Fig. 2-8.
The cassette compartment can be mechanically raised and the cassette taken out in case of power failure or ejected after a mechanical stop during play. This is done by pulling out the rod to release the lock arm by hand. Releasing the lock arm permits manual upward movement of the cassette compartment.

Note: When lifting the cassette compartment manually, use care so as not to damage the tape.

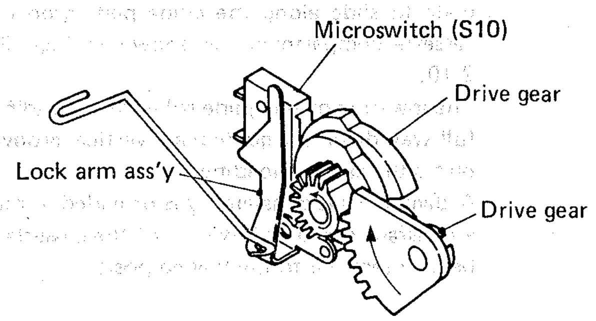


Fig. 2-8

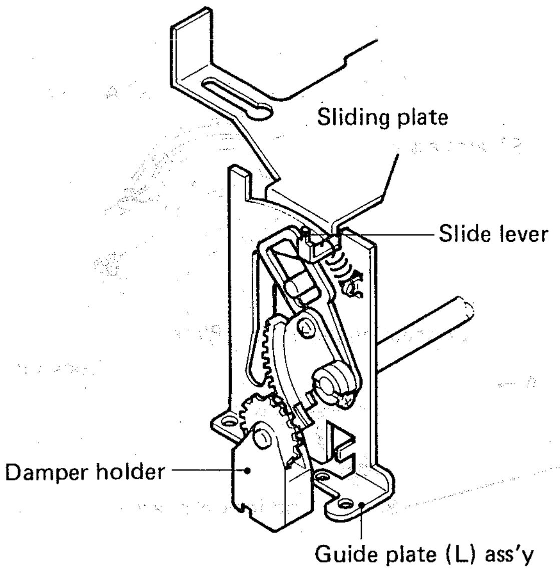


Fig. 2-9

2.1.2 Loading and Unloading

The loading operation covers the period from completion of draw and proceeds to wrap the tape about the head drum. Conversely, unloading disengages the tape the drum and completes with the store process.

1. Loading operation
   At the end of the tape drawing action, the draw end switch is turned on with a simultaneous release of the brake on the take-up reel, causing the take-up reel motor to run to the effect that the tape is taken up to a proper amount of tension. The loading motor begins rotation and this turns the loading ring via a gear as shown in Fig. 2-12.
   At completion of draw, the return roller atop the loading ring further extracts the tape and, with rotation of the loading ring, the tape becomes wound about the head drum. The loading ring functions as a cam during winding to move the return pole ass'y and determine the tape retaining position. The return pole assembly is activated to turn on both the Microswitch S8 and the Loading End Zone switch, causing the supply reel motor to be driven through the tension servo circuit. This will make it possible to extract the tape from the supply reel as well until the loading has rotated to its stop. Normally, the loading ring holds the return pole at a position lower than the tape path in order to avoid interference with tape movement. See Fig. 2-11 & 2-12.

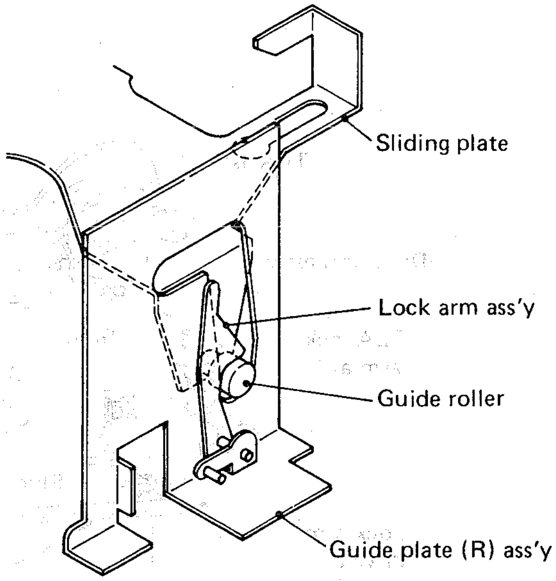


Fig. 2-10

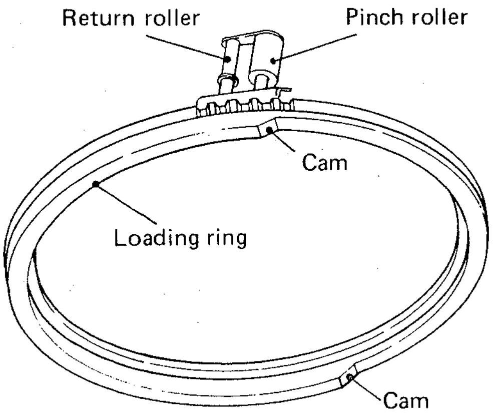

Return roller
Pinch roller
Cam
Loading ring
Cam

Fig. 2-11

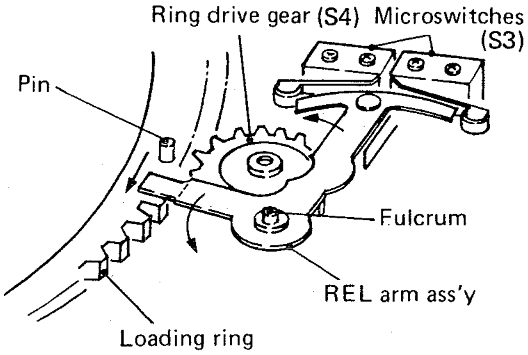

Ring drive gear (S4)
Microswitches (S3)
Pin
Fulcrum
REL arm ass'y
Loading ring

Fig. 2-12

A pin is provided atop the loading ring. When the ring rotates to the end position, this pin presses the ring end lock arm ass'y. Loading end switch S4 is coupled to this ass'y and stops the loading motor when pressed by the loading ring.

Pinch roller pressure is applied approx. 0.4 sec after the loading motor stops. The moment the pinch roller is brought into contact with the capstan, the capstan motor starts running, causing the tape to move. About 0.7 second after this tape transport, the capstan motor pinch solenoid, take-up reel motor solenoid and take-up reel motor are turned off, applying a reverse brake on the drum motor, which sets the machine in Stop mode.

2. Unloading operation
   The phase of unloading includes the rewinding of tape around the drum, with the machine in Stop mode, through the unloading ring to set the system to complete the drawing function.
   When the machine is in the Stop mode, pressing the EJECT button brings the drum motor to run while starting reversal of the ring motor.

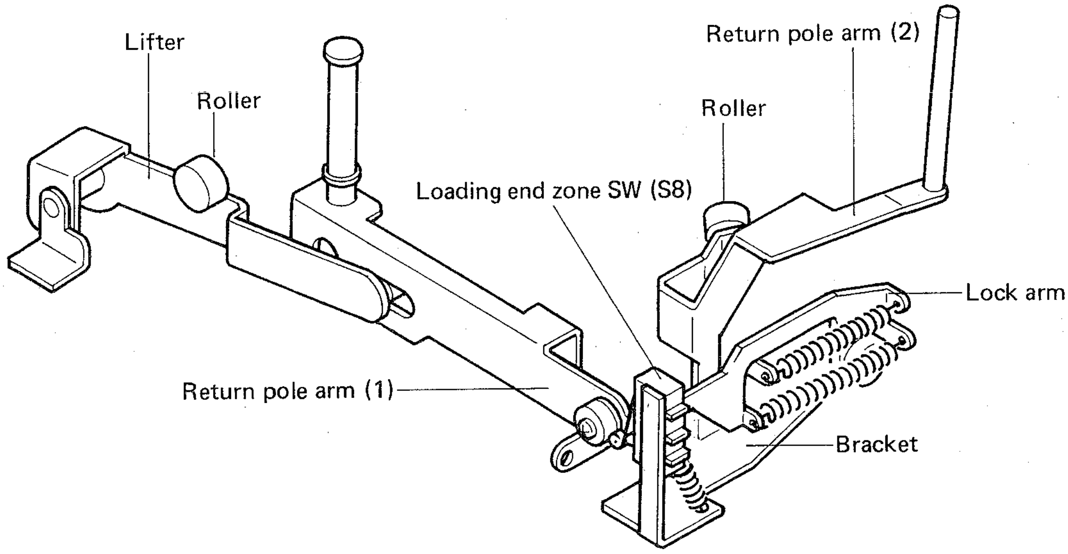

Lifter
Roller
Return pole arm (2)
Roller
Loading end zone SW (S8)
Lock arm
Return pole arm (1)
Bracket

Fig. 2-13

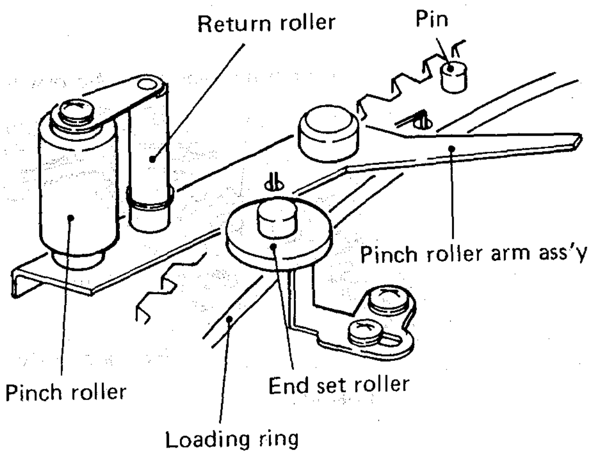

Return roller
Pin
Pinch roller arm ass'y
Pinch roller
End set roller
Loading ring

Fig. 2-14

When the loading ring rotates once, the loading ring pin again contacts the ring end lock arm ass'y and unloading end switch S3 becomes on. During unloading, the end set roller guides the pinch roller to the bottom of the cassette. See Fig. 2-14.

2.1.3 Play mode

When the machine is in the Stop mode, pressing the PLAY button causes both the drum motor and the capstan motor to run, activating the pinch solenoid. The take-up reel motor rotates when pinch roller pressure is applied and the tape begins running. Tape tension is detected by the take-up tension roller and is maintained at a stable value.

The supply tension roller detects tape back tension and the supply motor rotates to maintain this at a fixed value.

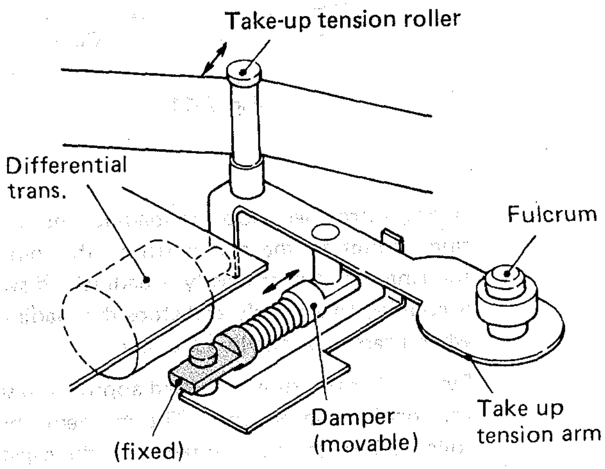

Take-up tension roller
Differential trans.
Fulcrum
(fixed)
Damper (movable)
Take up tension arm

Fig. 2-15

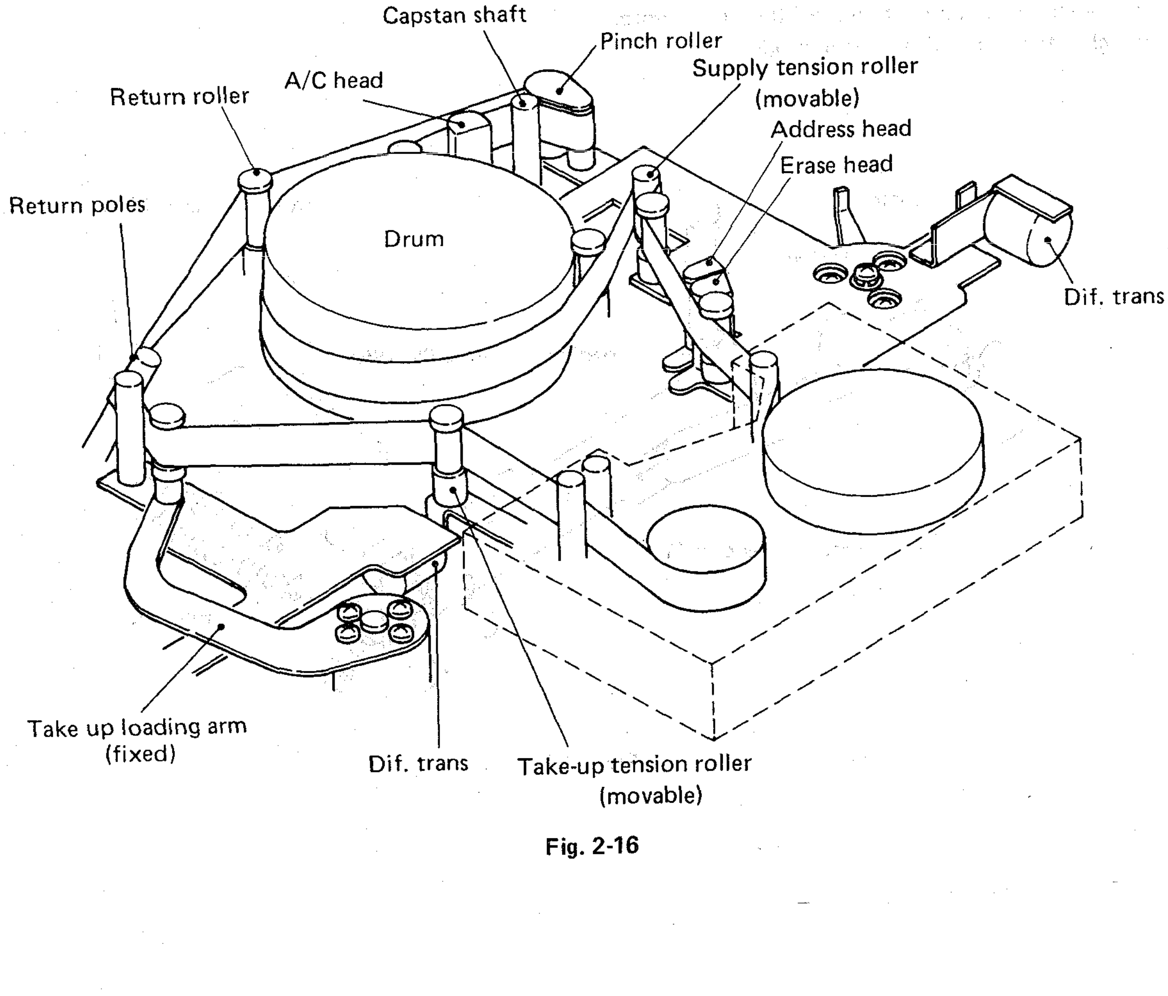

Capstan shaft
Pinch roller
Supply tension roller (movable)
A/C head
Return roller
Address head
Erase head
Return poles
Drum
Dif. trans
Take up loading arm (fixed)
Dif. trans
Take-up tension roller (movable)

Fig. 2-16

Detectors for tension control are comprised of the tension roller and differential transformers, which convert the roller positions into electrical values. The differential transformer outputs go to the servo circuit, which in turn controls reel motor rotation. See Fig. 2-15 – Fig. 2-17.

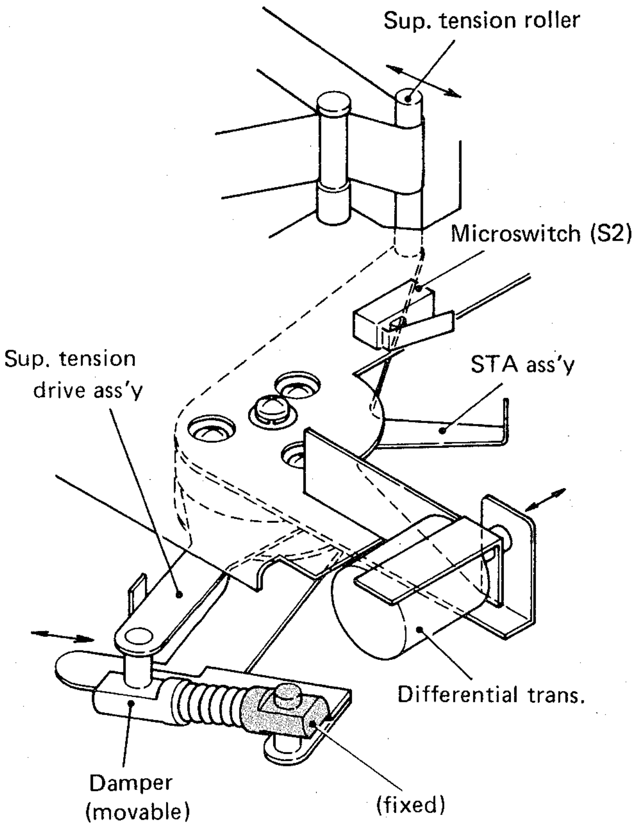

Sup. tension roller
Microswitch (S2)
Sup. tension drive ass'y
STA ass'y
Differential trans.
Damper (movable)
(fixed)

Fig. 2-17

2.1.4 Fast forward (FF)

With the machine in loading end position, the capstan motor provides fast forwarding of the tape at a rate equivalent to 15 times the normal tape speed. (The FF will be fully wound up within 4.5 minutes.)

When the machine is in the Stop mode, depressing the FAST FORWARD button causes the drum motor and the pinch solenoid to be activated, while simultaneously starting the capstan motor, supply reel motor and take-up reel motor. The machine is now in Fast Forward mode.

If the machine is switched into Fast Forwarding from Play mode, the tape transport speed is increased by the capstan motor to 15 times the normal speed, with a corresponding increase in the speed of the reel motor.

2.1.5 Rewind (REW)

Rewinding of the tape is effected at a rate equivalent to 15 times the normal tape speed when the machine is in loading position.

With the machine in Stop mode, pressing the REWIND button causes both the drum motor and the pinch solenoid to be activated, starting the reverse motion of the capstan motor at a speed 15 times faster than the normal tape speed.

Simultaneously, the supply reel motor and take-up reel motor will start running. This is called the Rewind mode.

When the machine is set in the Playback mode, pressing the Rewind button brings the capstan motor to a momentary transit stop for 0.3 second and immediately starts tape reversing at a rate 15 times faster than the normal speed.

The direction of rotation of the reel motor will also change.

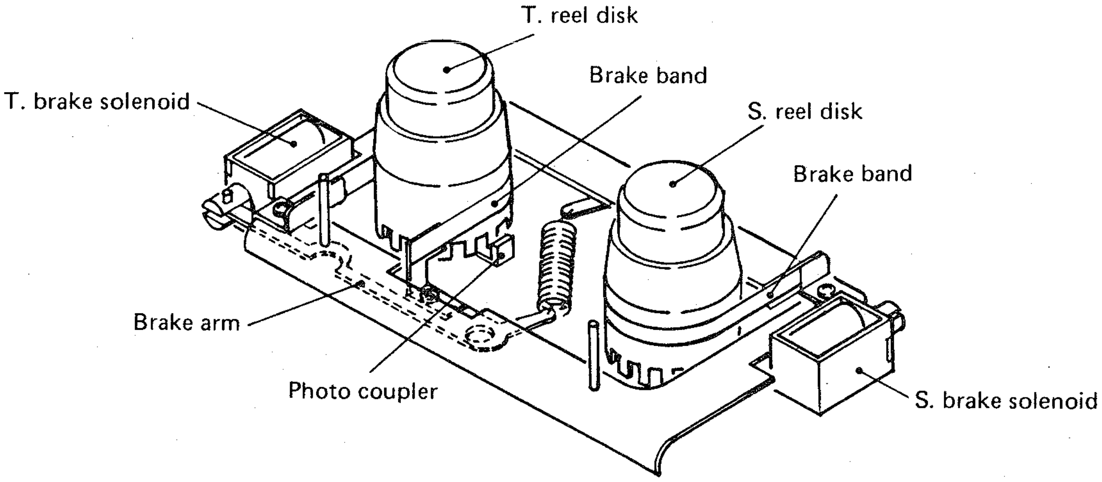

T. reel disk
Brake band
S. reel disk
Brake band
T. brake solenoid
Brake arm
Photo coupler
S. brake solenoid

Fig. 2-18

SECTION 3
ELECTRIC SYSTEM DESCRIPTION

The electric circuits of AD Series VCR are broadly classified into the following circuits.

1. System Control Circuit
   This is the main circuit of the set, which relates to all circuits of the electric system and controls elements of the mechanical system in all modes.
2. Servo Control Circuits
   This VCR employ drum servo and capstan servo systems. For proper video recording and reproduction, high efficiency servo circuits are provided. In addition, there is a reel servo circuit, which controls the tension of the video tape.
3. Video Circuits
   These circuits are for FM modulation and demodulation in order to record and reproduce video signals. There are also circuits for lowband conversion of color signals and correction of time axis error of reproduced signals.
4. Audio Circuit
   This is a circuit for recording and reproducing voice signals.

* In this manual the system control circuits which are considered particularly necessary to understand on the new series VCR have been selected and described. The circuits which are commonly used in conventional VCRs or those which are considered to be thoroughly understandable when the set is looked at have been omitted.

3.1 SYSTEM CONTROL CIRCUIT

3.1.1 General

This model features "feather touch" operation. The system control circuit, receiving mode command signals from various control switches of the mainframe or remote control unit, drives LEDs, motors and solenoids to set the selected mode. Further, the circuit supplies mode control signals of the set to various circuit boards to set the selected mode.
In addition, in order to protect the set and the tape, various internal sensors are provided. By continuously monitoring these sensors, the decision is made to continue or stop the mode in progress or shift to another mode.

Detection and control of these operation modes are performed through a built-in microcomputer. The microcomputer employed by this set is preprogrammed and the program cannot be altered by the user.

In the following description, "system control" is shortened to "syscon".

3.1.2 I/O block diagram description

The block diagram is shown in Fig. 3-4.
The syscon circuit receives the operation key inputs from the control circuit board and mode detect signals from the various sensors in the deck. These signals are scanned and taken by the microcomputer at regular intervals. The microcomputer judges the operation mode according to these input signals and drives the ring motor and arm motor as required according to the operating state and further, sends command signals of direction of rotation and speed to the servo circuits.

A tape is run by switching 3 solenoids according to a command signal from the microcomputer. The timing for switching these 3 solenoids is obtained from the 400 kHz reference clock which is input to the microcomputer. The microcomputer stores operation modes and displays them on LEDs, and at the same time, sends mode control signals to the servo, video and audio circuits. These control functions are performed by the central processing unit (CPU) of IC3, which is a 4-bit single-chip microcomputer.
When the input side of CPU in the block diagram is looked at, the CPU input port has only 16 input terminals; Port A is 4-bit and Port B, C and D are 4-bit. However, the input from control keys and sensors totals more than 30 inputs so that it is impossible to input all of these inputs directly to the CPU (IC3). For this

reason, IC10 is provided at the input side as an input expander. IC10 is a multiplexer and using the 3-bit bus select signal from the output port E of the CPU IC3 (strobe data irrelevant), 7 inputs are selected as one output and sent to the CPU (IC3).
Thus, IC10 consists of 4 multiplexers, each of which selects one signal from among seven inputs and supplies it to the input port A of the CPU (IC3).

In a similar manner, IC12 and IC1 of syscon drive circuit as output expanders for CPU (IC3), are provided at the output side of the CPU (IC3). These comprise 4 demultiplexers, each of which converts one signal from CPU (IC3) output F into seven demultiplexed outputs. The 3-bit bus select and strobe data outputs from CPU (IC3) output port E, I determine the signals applied to each demultiplexer.
That is, IC12 and IC1 consist of 4 demultiplexers which supply 7 demultiplexed outputs from one input, and are the output expanders which supply 28 demultiplexed outputs from 4-bit outputs from the output port F of IC3 CPU.

3.1.3 Principal components connected to the system control circuit board

1.	Dew Sensor	If moisture is condensed, the warning LED flashes intermittently (approx. 6 sec. cycle) and the eject mechanism only operates.

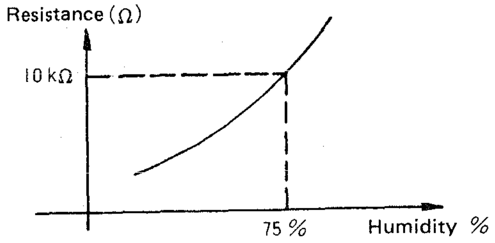


Fig. 3-1

2.	Start and End LED	Light source for the start and end sensors
3.	End Sensor	Tape trailer detector
4.	Start Sensor	Tape leader detector
5.	Cassette Compartment Switch	Checks if a cassette tape is loaded.
6.	Loading End Switch . . .	Detects if the loading has ended.
7.	Unloading End Switch . .	Detects if the unloading has ended.
8.	REC Safety Switch	Detects if a cassette tape has a safety tab for preventing accidental erasure.
9.	Pinch Solenoid	Runs the tape.
10.	Take-up Solenoid	Fixes the reel in the stop mode.
11.	Supply Solenoid	When ON, the brake is released.
12.	Arm Motor	Draws out and stores the tape.
13.	Ring Motor	Loading and unloading the tape
14.	Draw End Switch	Detects if the draw operation has ended.
15.	Pinch Roller Switch . . .	Detects if the pinch roller solenoid is pulled.
16.	Store End Switch	Detects if the store operation has ended.
17.	Cassette Compartment Switch . . .	Detects if the cassette compartment motor gear has rotated.
18.	Loading End Zone Switch	When the loading end zone switch is ON, the supply tension control operates to improve the rise in the play reservation mode.

3.1.4 Description of the main ICs

1. IC3 (CPU)

Name	Input/Output	Functions
INT	Input	Interrupt request input.
RES	″	Reset input.
PA3-0	″	Input ports A3-0. 4-bit inputs with bit test capability.
PB3-0	″	Input ports B3-0. 4-bit inputs with bit test capability.
PC3-0	Input/Output	Input/output ports C3-0. In the input mode, 4-bit inputs with bit test capability. During the output mode, 4-bit outputs with immediate data output capability.
PD3-0	″	Input/output ports D3-0. In the input mode, 4-bit inputs with bit test capability. During the output mode, 4-bit outputs with immediate data output capability.
PE3-0	Output	Output ports E3-0. 4-bit outputs with bit set and reset capability.
PF3-0	″	Output ports F3-0. 4-bit outputs with bit set and reset capability.
PG3-0	″	Output ports G3-0. 4-bit outputs with bit set and reset capability.
PH3-0	″	Output ports H3-0. 4-bit outputs with bit set and reset capability.
PI2-0	″	Output ports I2-1. 3-bit outputs with bit set and reset capability.
CL1-0	—	Connections for external LC resonance circuit (IFT, etc.) for use by the internal clock oscillator.
TEST	Input	LSI test terminal. Normally connect to Vss (OV).

Table 3-1

2. Input/Output Expanders
IC10, IC12 and driver of IC1 are used to expand the input and output ports of the IC3 microcomputer. General internal construction of these ICs is shown in Fig. 3-2.

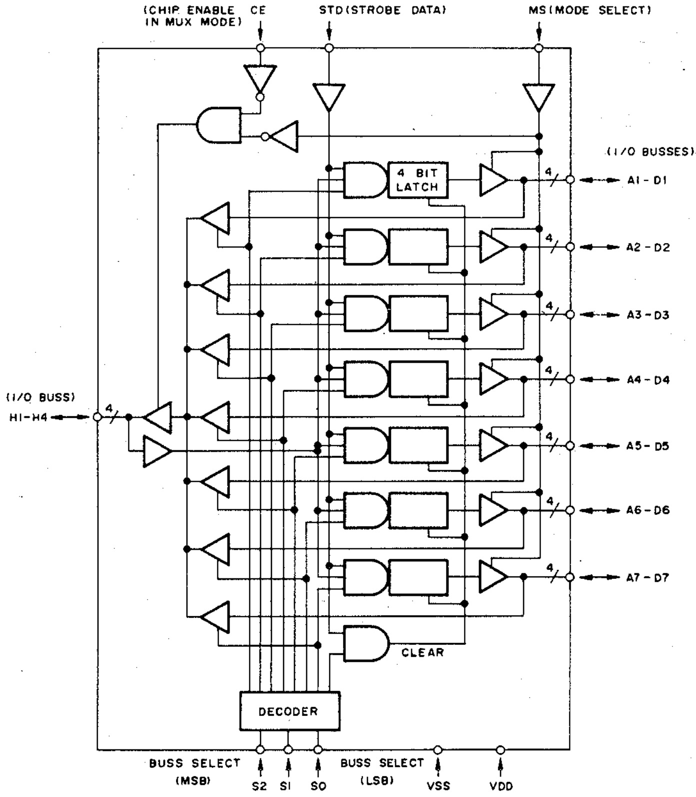


Fig. 3-2

By low input to both $\overline{CE}$ (Chip Enable) and MS (Mode Select), inputs to A1—D7 are routed to outputs to H1—H4 (IC10 multiplexer function).
With high input at CE and MS, H1—H4 are expanded and sent to outputs A1—D7 (IC12 and 1 demultiplexer function). The outputs are enabled by high input to STD (strobe) and inhibited by a low input. Port E outputs of the microcomputer are distributed to IC12 and IC1, while the STD signal from CPU port I selects which of these ICs produce an output.
S terminal control data input and output. Binary data at S0, S1 and S2 are converted to decimal by the decoder (i.e., $2^3 = 8$). This terminal then selects data from among 1—7. Refer to Table 3-2.

I/O PORT	S2, S1, S0						
	LLH	LHL	LHH	HLL	HLH	HHL	HHH
H1	A1	A2	A3	A4	A5	A6	A7
H2	B1	B2	B3	B4	B5	B6	B7
H3	C1	C2	C3	C4	C5	C6	C7
H4	D1	D2	D3	D4	D5	D6	D7

Table 3-2

For example, when control command port S2, S1, S0 are H, L and L, respectively, A4, B4, C4 and D4 become inputs or outputs to H1, H2, H3 and H4, respectively.

3.1.5 Warning conditions

1. In the following state, the warning LED and the mode LED flash to inform abnormality, and LED (D5) in the syscon circuit board is lighted by the latching relay. The warning mode is released when the reset switch (S1) in the syscon circuit board is pressed.

- When the wiring of LEDs for the tape start and tape end sensors is disconnected.
- When the capstan motor does not run.
- When tape run is abnormal and the take-up reel disk does not rotate.
- When eject operation is not completed within approx. 6 sec.
- When the rotating drum does not run.
- If the pinch roller solenoid is not separated from the capstan even when the eject switch is pressed in the standby (stop) mode.
- If the pinch roller solenoid is separated from the capstan when the eject switch is pressed but the ring motor does not rotate in the standby (stop) mode.
- When unloading is not completed within approx. 6 sec.
- When the arm stops to move during the storage operation, after approx. 6 sec. the draw is once made and then, the storage operation is commenced. Further, when the arm does not operate for approx. an additional 6 sec.

In the above cases, the LEDs flash about 5 times/sec.

- When moisture is condensed: The LEDs flash intermittently (approx. 6 sec. cycle).
The LED in the syscon circuit board does not light.

2. Other abnormal condition (The warning LED does not light.)

- When loading is not completed within approx. 6 sec. after the cassette loading is started. In this case, the tape should be unloaded.

3.1.6 Mode shifting

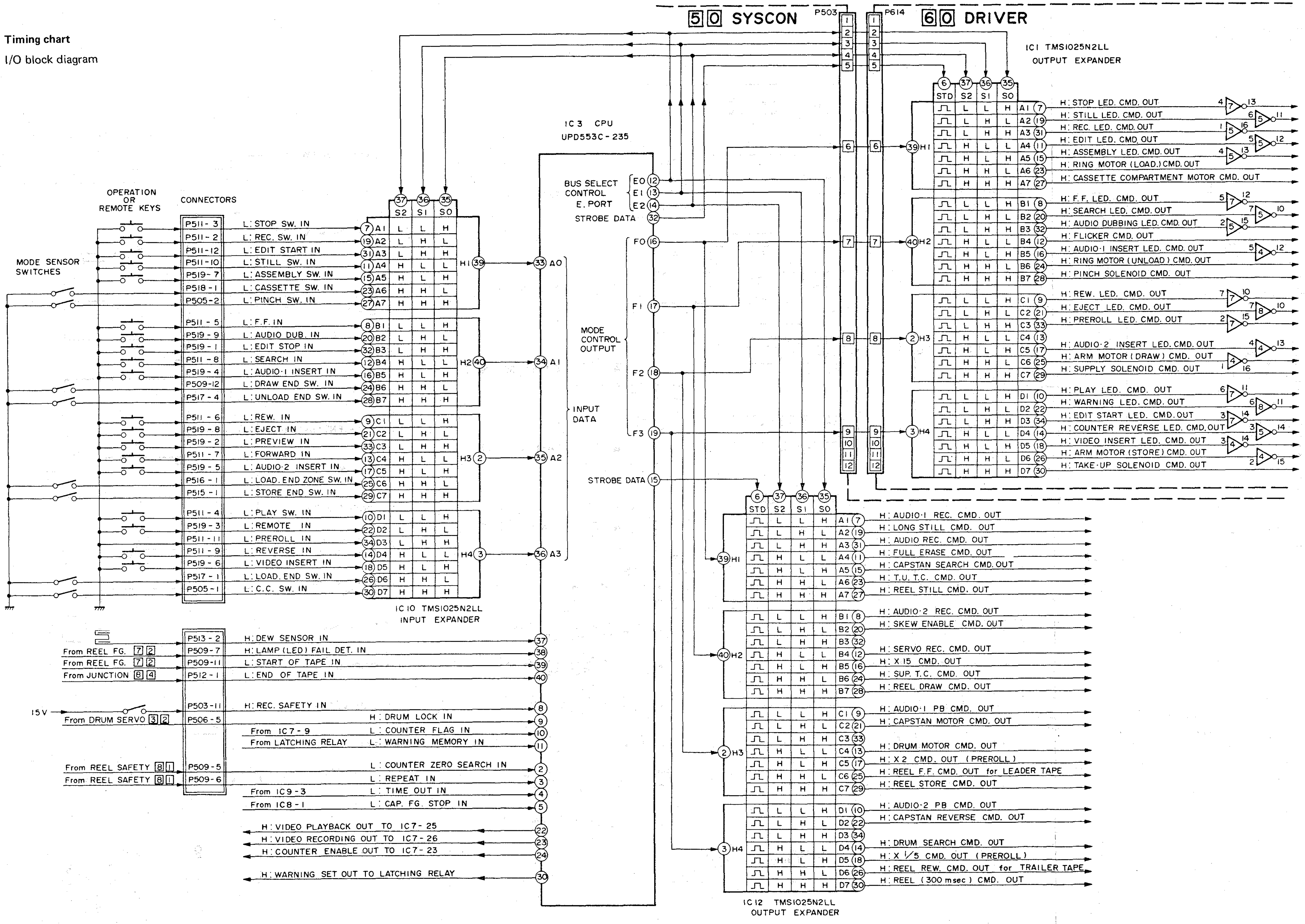
OPERATION KEY CURRENT MODE	PLAY MODE								REC MODE						FF/REW MODE		EJECT MODE	
	DRAW	LOADING	PLAY	STILL	STOP	STOP (STAND BY)	SEARCH FF	SEARCH REW	EDIT STOP	REC	PAUSE	ASSEMBLY	AUDIO-1 AUDIO-2	VIDEO INSERT	FF	REW	EJECTING	EJECT
EJECT		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
STOP			YES	YES			YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	YES	YES
PLAY				YES	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	NO	NO	NO	NO
STILL			YES		NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	NO	NO	NO	NO
PAUSE			NO	NO	NO	YES	NO	NO	NO	YES		NO	NO	NO	NO	NO	NO	NO
FF			YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO		YES	NO	NO
REW			YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES		NO	NO
PLAY ⊕ REC			NO	NO	NO	YES	NO	NO	NO		YES	NO	NO	NO	NO	NO	NO	NO
PLAY ⊕ ASSEMBLY			NO	NO	NO	YES	NO	NO	YES	NO	NO		NO	NO	NO	NO	NO	NO
PLAY ⊕ AUDIO-1, 2			NO	NO	NO	YES	NO	NO	YES	NO	NO	NO		YES	NO	NO	NO	NO
PLAY ⊕ VIDEO			NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	YES		NO	NO	NO	NO
SEARCH FF			YES	YES	NO	YES		YES	NO	NO	NO	NO	NO	NO			NO	NO
SEARCH REW			YES	YES	NO	YES	YES		NO	NO	NO	NO	NO	NO			NO	NO
INSERT	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	YES	YES	YES	YES
EJECTING			YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	NO	NO	YES	YES		YES
EJECT LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
STOP LED	ON	ON	OFF	OFF	ON	ON	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
STILL LED	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
PAUSE LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
PLAY LED	OFF	OFF	ON	ON	OFF	OFF	ON	ON		ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF
FF LED	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF		OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
REW LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON		OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
REC LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ASSEMBLY LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
AUDIO-1, 2 LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
VIDEO LED	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
CAPSTAN MOTOR	OFF	OFF	ON	OFF	OFF	OFF	ON	ON		ON	ON→OFF	ON	ON	ON	ON	ON	OFF	OFF
DRUM MOTOR	OFF	ON	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	ON	OFF
RING MOTOR	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
ARM MOTOR	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF→ON	OFF
C.C MOTOR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON→OFF
TAKE UP MOTOR	ON	ON	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	ON	OFF
SUPPLY MOTOR	ON	OFF→ON	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	OFF	OFF
PINCH SOLENOID	OFF	OFF	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	OFF	OFF
TAKE UP SOLENOID	ON	ON	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	ON	OFF
SUPPLY SOLENOID	ON	OFF→ON	ON	ON	OFF	ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	OFF→ON	OFF

NOTE : OFF=BLANK SPACE

Table 3-3

3.1.7 Timing chart

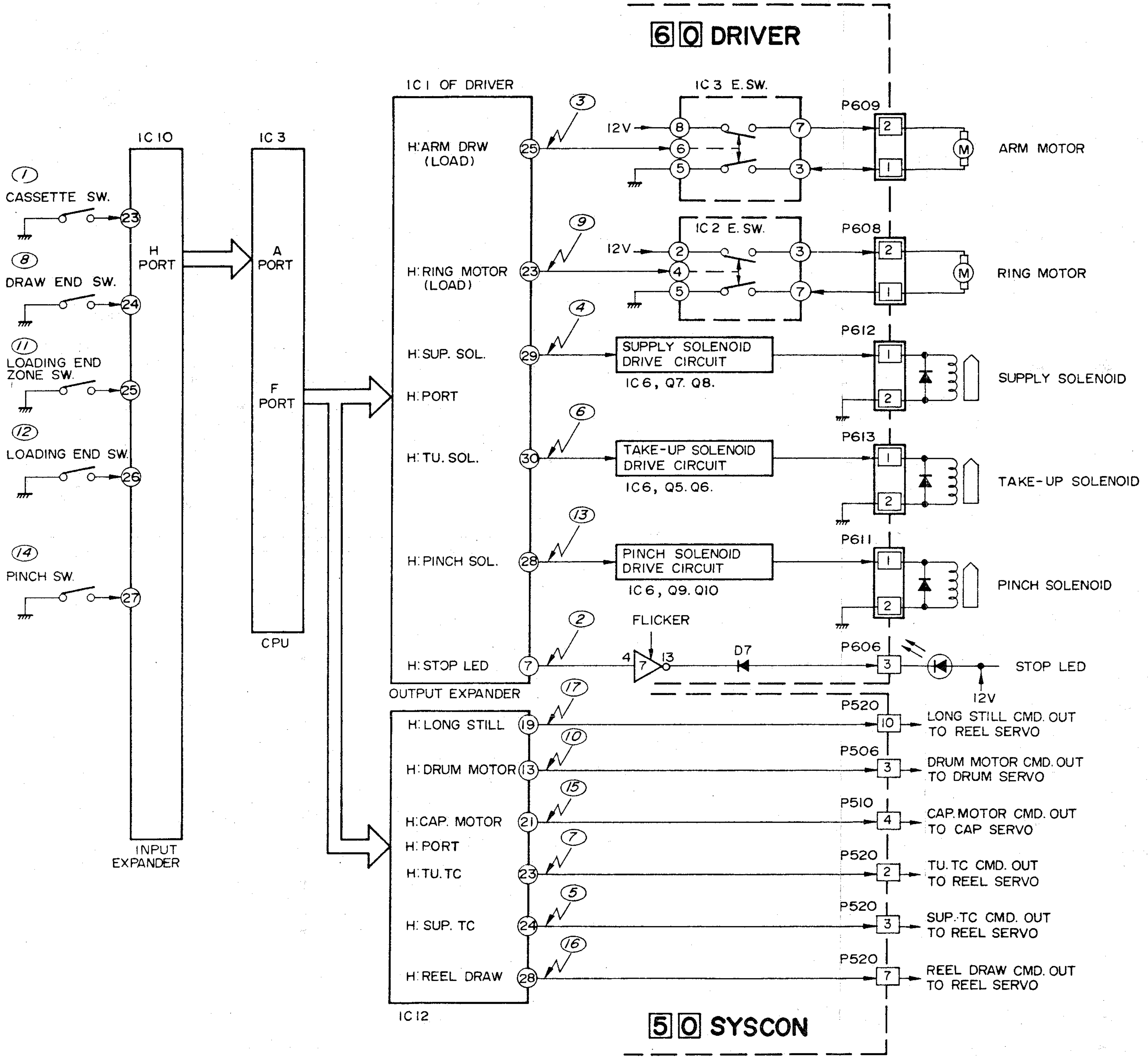
1. I/O block diagram



50 SYSCON
P503
60 DRIVER
P614
IC1 TMS1025N2LL
OUTPUT EXPANDER
IC3 CPU
UPD553C-235
BUS SELECT CONTROL E. PORT
E0 12
E1 13
E2 14
STROBE DATA 32
MODE CONTROL OUTPUT
F0 16
F1 17
F2 18
F3 19
STROBE DATA 15
INPUT DATA
A0 A1 A2 A3
OPERATION OR REMOTE KEYS
CONNECTORS
MODE SENSOR SWITCHES
STD S2 S1 S0
P511-3 L: STOP SW. IN
P511-2 L: REC. SW. IN
P511-12 L: EDIT START IN
P511-10 L: STILL SW. IN
P519-7 L: ASSEMBLY SW. IN
P518-1 L: CASSETTE SW. IN
P505-2 L: PINCH SW. IN
P511-5 L: F.F. IN
P519-9 L: AUDIO DUB. IN
P519-1 L: EDIT STOP IN
P511-8 L: SEARCH IN
P519-4 L: AUDIO-1 INSERT IN
P509-12 L: DRAW END SW. IN
P517-4 L: UNLOAD END SW. IN
P511-6 L: REW. IN
P519-8 L: EJECT IN
P519-2 L: PREVIEW IN
P511-7 L: FORWARD IN
P519-5 L: AUDIO-2 INSERT IN
P516-1 L: LOAD. END ZONE SW. IN
P515-1 L: STORE END SW. IN
P511-4 L: PLAY SW. IN
P519-3 L: REMOTE IN
P511-11 L: PREROLL IN
P511-9 L: REVERSE IN
P519-6 L: VIDEO INSERT IN
P517-1 L: LOAD. END SW. IN
P505-1 L: C.C. SW. IN
IC10 TMS1025N2LL
INPUT EXPANDER
From REEL FG. 72 P513-2 H: DEW SENSOR IN
From REEL FG. 72 P509-7 H: LAMP (LED) FAIL DET. IN
From JUNCTION 84 P509-11 L: START OF TAPE IN
P512-1 L: END OF TAPE IN
15V P503-11 H: REC. SAFETY IN
From DRUM SERVO 32 P506-5 H: DRUM LOCK IN
From IC7-9 L: COUNTER FLAG IN
From LATCHING RELAY L: WARNING MEMORY IN
From REEL SAFETY 81 P509-5 L: COUNTER ZERO SEARCH IN
From REEL SAFETY 81 P509-6 L: REPEAT IN
From IC9-3 L: TIME OUT IN
From IC8-1 L: CAP. FG. STOP IN
H: VIDEO PLAYBACK OUT TO IC7-25
H: VIDEO RECORDING OUT TO IC7-26
H: COUNTER ENABLE OUT TO IC7-23
H: WARNING SET OUT TO LATCHING RELAY
H: STOP LED. CMD. OUT
H: STILL LED. CMD. OUT
H: REC. LED. CMD. OUT
H: EDIT LED. CMD. OUT
H: ASSEMBLY LED. CMD. OUT
H: RING MOTOR (LOAD.) CMD. OUT
H: CASSETTE COMPARTMENT MOTOR CMD. OUT
H: F.F. LED. CMD. OUT
H: SEARCH LED. CMD. OUT
H: AUDIO DUBBING LED. CMD. OUT
H: FLICKER CMD. OUT
H: AUDIO-1 INSERT LED. CMD. OUT
H: RING MOTOR (UNLOAD) CMD. OUT
H: PINCH SOLENOID CMD. OUT
H: REW. LED. CMD. OUT
H: EJECT LED. CMD. OUT
H: PREROLL LED. CMD. OUT
H: AUDIO-2 INSERT LED. CMD. OUT
H: ARM MOTOR (DRAW) CMD. OUT
H: SUPPLY SOLENOID CMD. OUT
H: PLAY LED. CMD. OUT
H: WARNING LED. CMD. OUT
H: EDIT START LED. CMD. OUT
H: COUNTER REVERSE LED. CMD. OUT
H: VIDEO INSERT LED. CMD. OUT
H: ARM MOTOR (STORE) CMD. OUT
H: TAKE-UP SOLENOID CMD. OUT
H: AUDIO-1 REC. CMD. OUT
H: LONG STILL CMD. OUT
H: AUDIO REC. CMD. OUT
H: FULL ERASE CMD. OUT
H: CAPSTAN SEARCH CMD. OUT
H: T.U. T.C. CMD. OUT
H: REEL STILL CMD. OUT
H: AUDIO-2 REC. CMD. OUT
H: SKEW ENABLE CMD. OUT
H: SERVO REC. CMD. OUT
H: X 15 CMD. OUT
H: SUP. T.C. CMD. OUT
H: REEL DRAW CMD. OUT
H: AUDIO-1 PB CMD. OUT
H: CAPSTAN MOTOR CMD. OUT
H: DRUM MOTOR CMD. OUT
H: X 2 CMD. OUT (PREROLL)
H: REEL F.F. CMD. OUT for LEADER TAPE
H: REEL STORE CMD. OUT
H: AUDIO-2 PB CMD. OUT
H: CAPSTAN REVERSE CMD. OUT
H: DRUM SEARCH CMD. OUT
H: X 1/5 CMD. OUT (PREROLL)
H: REEL REW. CMD. OUT for TRAILER TAPE
H: REEL (300 msec) CMD. OUT
IC12 TMS1025N2LL
OUTPUT EXPANDER

Fig. 3-3

2. Insert cassette mode



60 DRIVER
50 SYSCON
IC10
INPUT EXPANDER
H PORT
IC3
A PORT
F PORT
CPU
① CASSETTE SW.
⑧ DRAW END SW.
⑪ LOADING END ZONE SW.
⑫ LOADING END SW.
⑭ PINCH SW.
IC1 OF DRIVER
OUTPUT EXPANDER
H:ARM DRW (LOAD)
H:RING MOTOR (LOAD)
H:SUP. SOL.
H:PORT
H:TU. SOL.
H:PINCH SOL.
H:STOP LED
IC3 E.SW.
IC2 E.SW.
12V
P609
P608
P612
P613
P611
P606
ARM MOTOR
RING MOTOR
SUPPLY SOLENOID DRIVE CIRCUIT
IC6, Q7. Q8.
TAKE-UP SOLENOID DRIVE CIRCUIT
IC6, Q5. Q6.
PINCH SOLENOID DRIVE CIRCUIT
IC6, Q9. Q10
SUPPLY SOLENOID
TAKE-UP SOLENOID
PINCH SOLENOID
FLICKER
D7
STOP LED
IC12
H:LONG STILL
H:DRUM MOTOR
H:CAP. MOTOR
H:PORT
H:TU. TC
H:SUP. TC
H:REEL DRAW
P520
P506
P510
LONG STILL CMD. OUT TO REEL SERVO
DRUM MOTOR CMD. OUT TO DRUM SERVO
CAP. MOTOR CMD. OUT TO CAP SERVO
TU. TC CMD. OUT TO REEL SERVO
SUP. TC CMD. OUT TO REEL SERVO
REEL DRAW CMD. OUT TO REEL SERVO

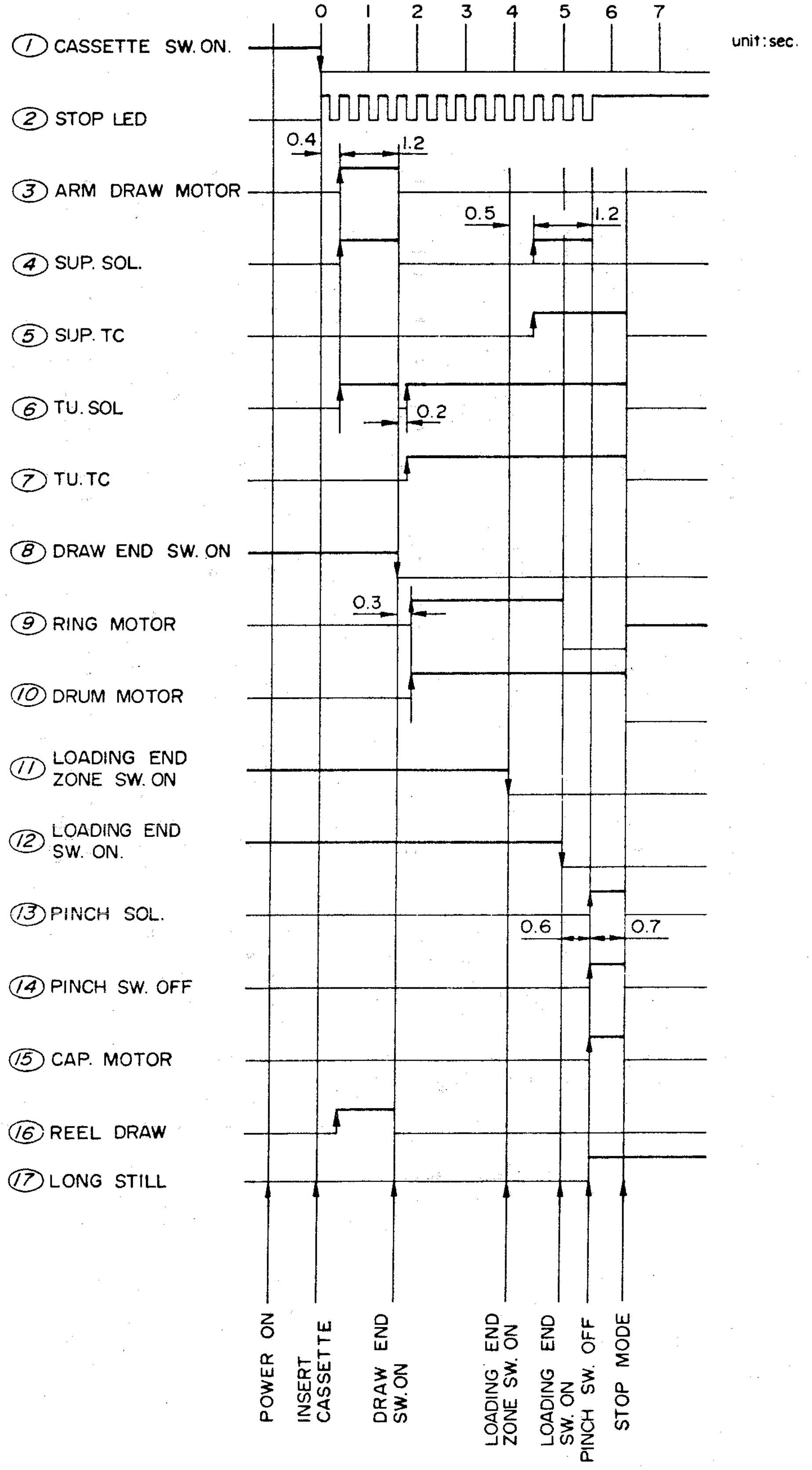
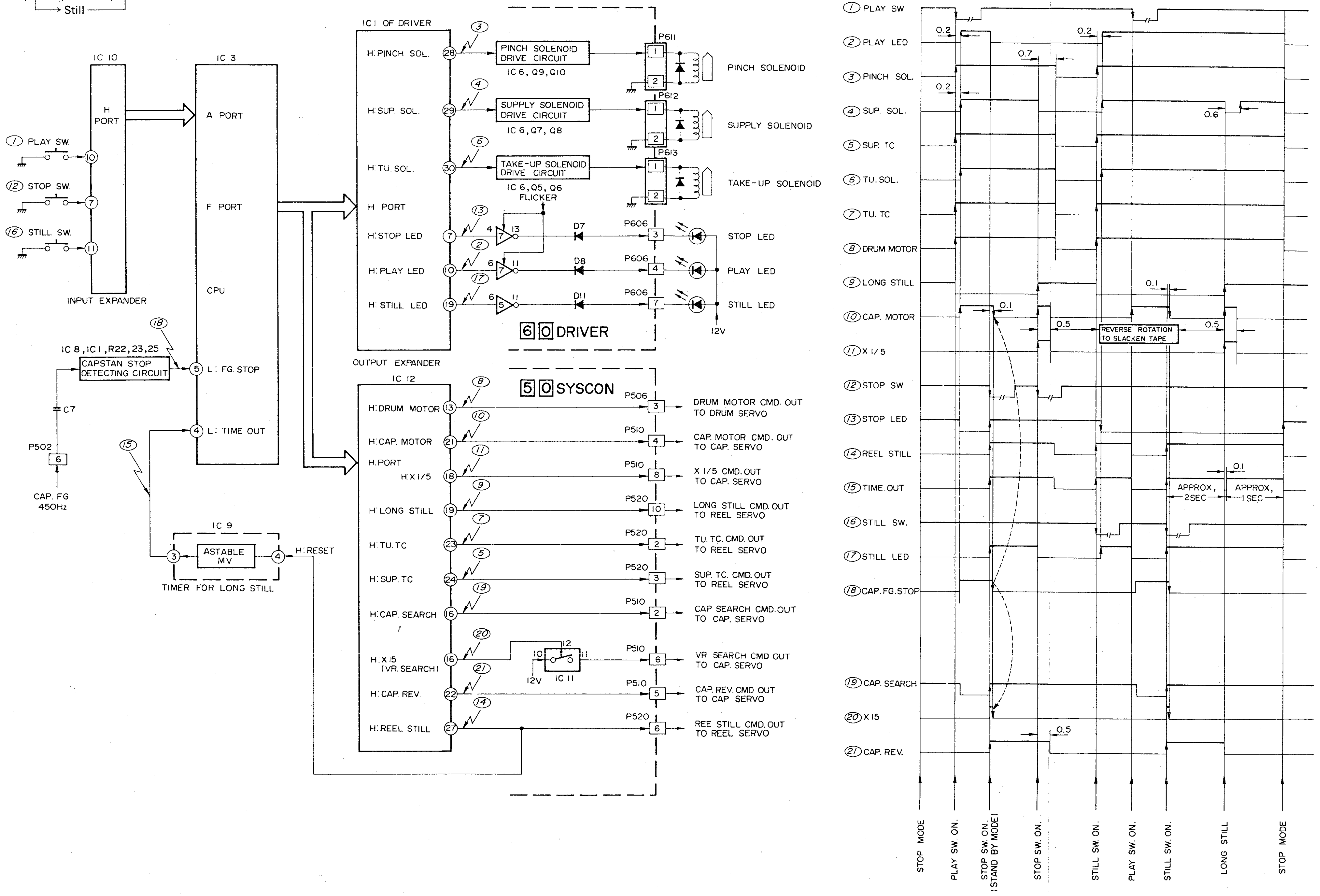


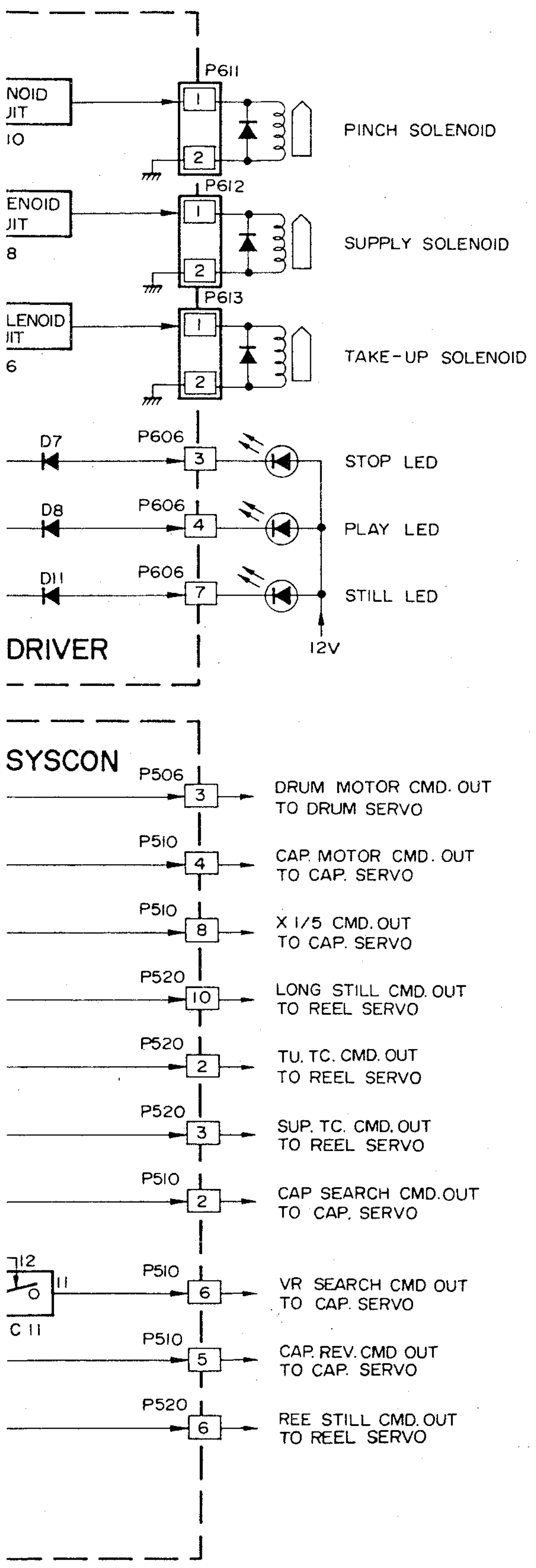
Fig. 3-4

3. Play → Stop (standby) → Stop mode
└→ Still ┘

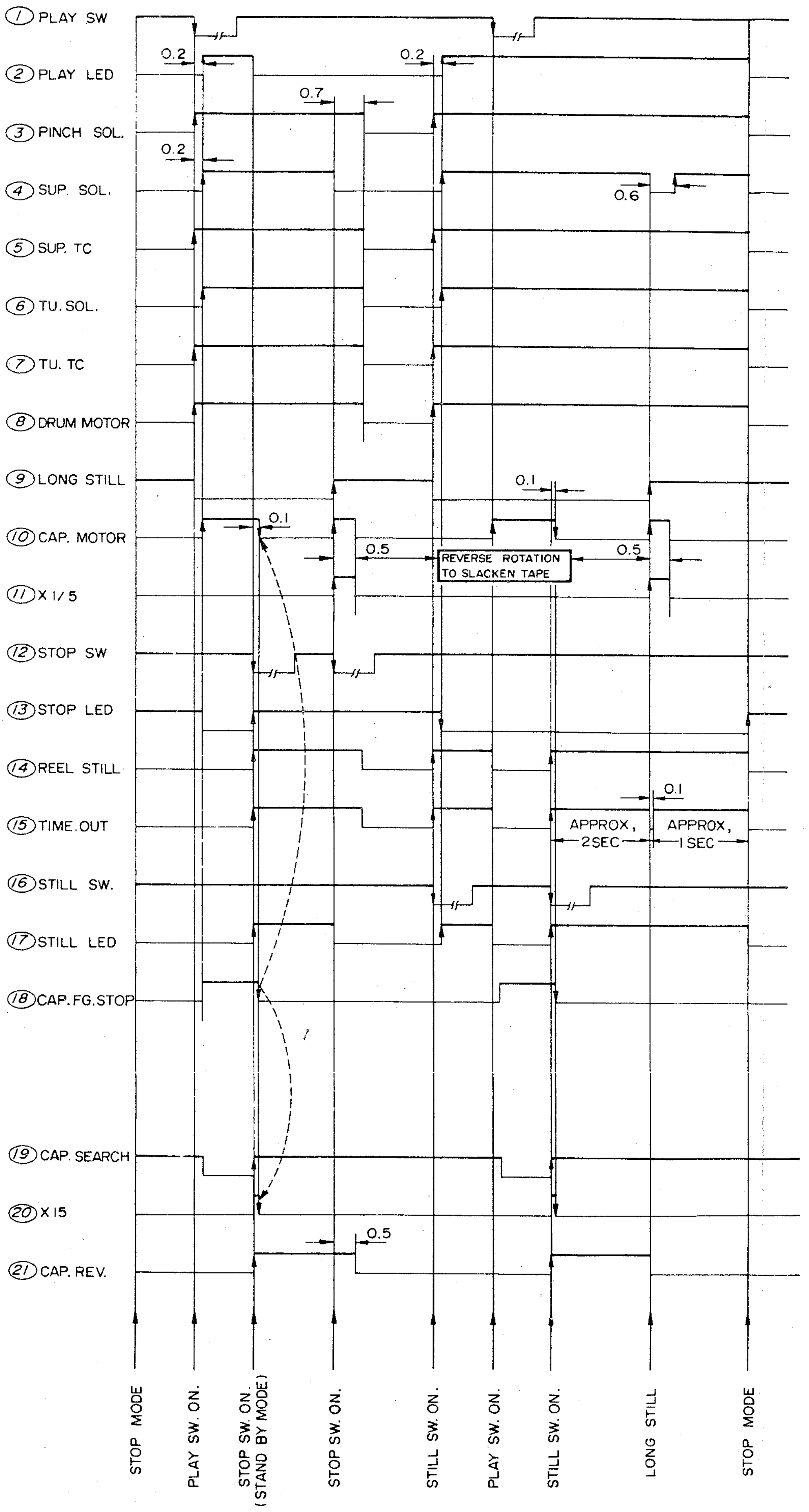


IC 10
H PORT
INPUT EXPANDER
① PLAY SW.
⑫ STOP SW.
⑯ STILL SW.
10
7
11
IC 3
A PORT
F PORT
CPU
⑱
IC 8, IC 1, R22, 23, 25
CAPSTAN STOP DETECTING CIRCUIT
5
L: FG. STOP
C7
P502
6
CAP. FG 450Hz
⑮
4
L: TIME OUT
IC 9
ASTABLE MV
3
4
H: RESET
TIMER FOR LONG STILL
IC 1 OF DRIVER
H: PINCH SOL.
28
③
PINCH SOLENOID DRIVE CIRCUIT
IC 6, Q9, Q10
P611
1
2
PINCH SOLENOID
H: SUP. SOL.
29
④
SUPPLY SOLENOID DRIVE CIRCUIT
IC 6, Q7, Q8
P612
SUPPLY SOLENOID
H: TU. SOL.
30
⑥
TAKE-UP SOLENOID DRIVE CIRCUIT
IC 6, Q5, Q6
P613
TAKE-UP SOLENOID
FLICKER
H PORT
H: STOP LED
⑬
4
13
D7
P606
3
STOP LED
H: PLAY LED
②
6
11
D8
P606
4
PLAY LED
H: STILL LED
⑰
6
11
D11
P606
7
STILL LED
12V
6 0 DRIVER
OUTPUT EXPANDER
IC 12
5 0 SYSCON
H: DRUM MOTOR
13
⑧
P506
3
DRUM MOTOR CMD. OUT TO DRUM SERVO
H: CAP. MOTOR
21
⑩
P510
4
CAP. MOTOR CMD. OUT TO CAP. SERVO
H. PORT
H: X 1/5
18
⑪
P510
8
X 1/5 CMD. OUT TO CAP. SERVO
H: LONG STILL
19
⑨
P520
10
LONG STILL CMD. OUT TO REEL SERVO
H: TU. TC
23
⑦
P520
2
TU. TC. CMD. OUT TO REEL SERVO
H: SUP. TC
24
⑤
P520
3
SUP. TC. CMD. OUT TO REEL SERVO
H: CAP. SEARCH
16
⑲
P510
2
CAP SEARCH CMD. OUT TO CAP. SERVO
H: X 15 (VR. SEARCH)
16
⑳
12
10
11
12V
IC 11
P510
6
VR SEARCH CMD OUT TO CAP. SERVO
H: CAP. REV.
22
㉑
P510
5
CAP. REV. CMD OUT TO CAP. SERVO
H: REEL STILL
27
⑭
P520
6
REE STILL CMD. OUT TO REEL SERVO
① PLAY SW
② PLAY LED
③ PINCH SOL.
④ SUP. SOL.
⑤ SUP. TC
⑥ TU. SOL.
⑦ TU. TC
⑧ DRUM MOTOR
⑨ LONG STILL
⑩ CAP. MOTOR
⑪ X 1/5
⑫ STOP SW
⑬ STOP LED
⑭ REEL STILL
⑮ TIME. OUT
⑯ STILL SW.
⑰ STILL LED
⑱ CAP. FG. STOP
⑲ CAP. SEARCH
⑳ X 15
㉑ CAP. REV.
0.2
0.2
0.2
0.7
0.6
0.1
0.1
0.5
0.5
REVERSE ROTATION TO SLACKEN TAPE
0.1
APPROX, 2SEC
APPROX, 1SEC
0.5
STOP MODE
PLAY SW. ON.
STOP SW. ON. (STAND BY MODE)
STOP SW. ON.
STILL SW. ON.
PLAY SW. ON.
STILL SW. ON.
LONG STILL
STOP MODE

Fig. 3-5



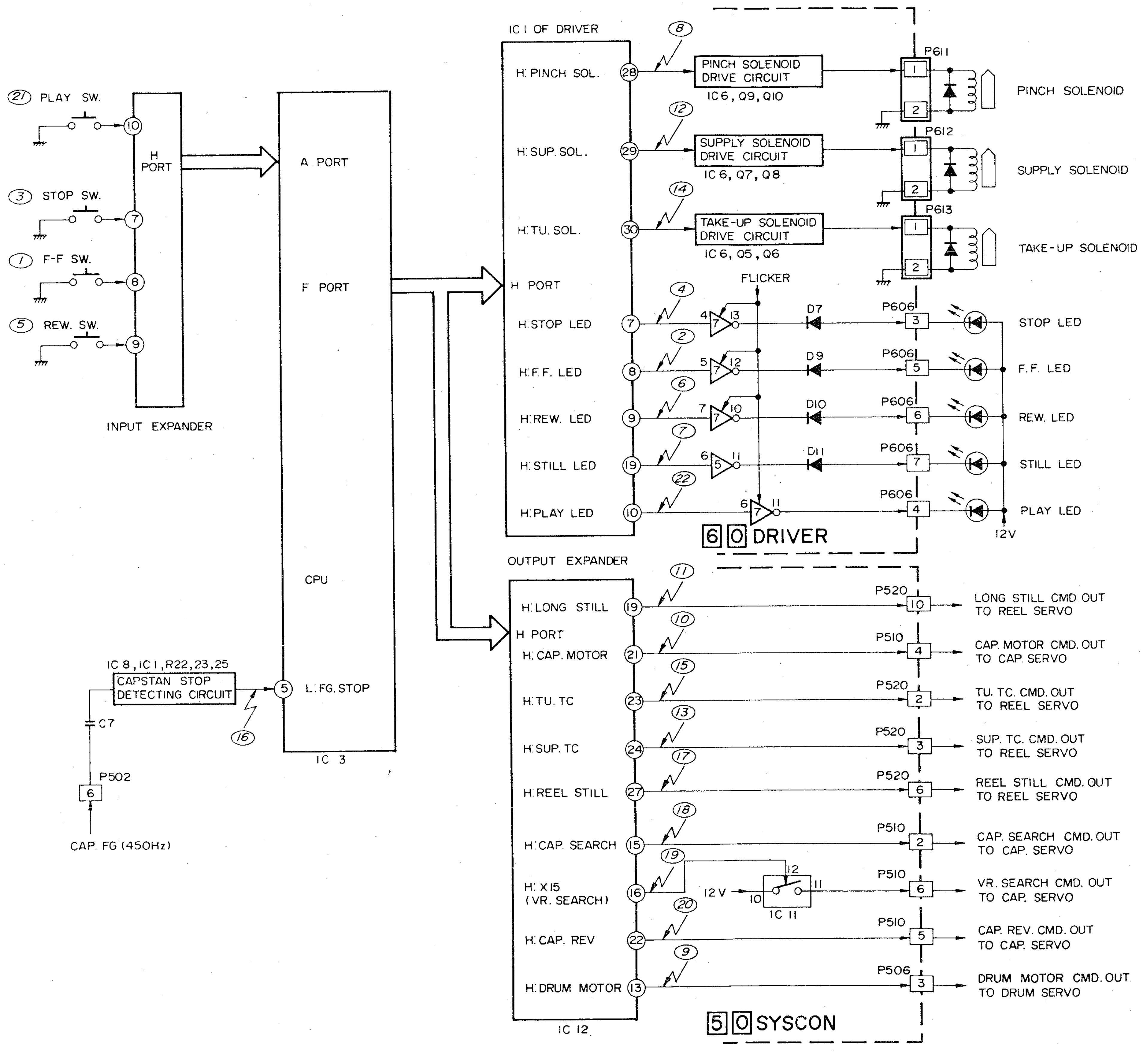
NOID
JIT
IO
P611
PINCH SOLENOID
ENOID
JIT
8
P612
SUPPLY SOLENOID
LENOID
JIT
6
P613
TAKE-UP SOLENOID
D7
P606
STOP LED
D8
P606
PLAY LED
D11
P606
STILL LED
12V
DRIVER
SYSCON
P506
DRUM MOTOR CMD. OUT TO DRUM SERVO
P510
CAP. MOTOR CMD. OUT TO CAP. SERVO
P510
X 1/5 CMD. OUT TO CAP. SERVO
P520
LONG STILL CMD. OUT TO REEL SERVO
P520
TU. TC. CMD. OUT TO REEL SERVO
P520
SUP. TC. CMD. OUT TO REEL SERVO
P510
CAP SEARCH CMD. OUT TO CAP. SERVO
12
11
C 11
P510
VR SEARCH CMD OUT TO CAP. SERVO
P510
CAP. REV. CMD OUT TO CAP. SERVO
P520
REE STILL CMD. OUT TO REEL SERVO



① PLAY SW
② PLAY LED
③ PINCH SOL.
④ SUP. SOL.
⑤ SUP. TC
⑥ TU. SOL.
⑦ TU. TC
⑧ DRUM MOTOR
⑨ LONG STILL
⑩ CAP. MOTOR
⑪ X 1/5
⑫ STOP SW
⑬ STOP LED
⑭ REEL STILL
⑮ TIME. OUT
⑯ STILL SW.
⑰ STILL LED
⑱ CAP. FG. STOP
⑲ CAP. SEARCH
⑳ X 15
(21) CAP. REV.
0.2
0.2
0.7
0.2
0.6
0.1
0.1
0.5
REVERSE ROTATION TO SLACKEN TAPE
0.5
0.1
APPROX, 2SEC
APPROX, 1SEC
0.5
STOP MODE
PLAY SW. ON.
STOP SW. ON. (STAND BY MODE)
STOP SW. ON.
STILL SW. ON.
PLAY SW. ON.
STILL SW. ON.
LONG STILL
STOP MODE

Fig. 3-5

4. Stop → FF → Stop (standby) → Rew → Play → FF → Rew → Stop mode



(21) PLAY SW.
(3) STOP SW.
(1) F-F SW.
(5) REW. SW.
H PORT
INPUT EXPANDER
A PORT
F PORT
CPU
L: FG. STOP
IC 3
IC 8, IC 1, R22, 23, 25
CAPSTAN STOP DETECTING CIRCUIT
C7
P502
CAP. FG (450Hz)
(16)
IC 1 OF DRIVER
H: PINCH SOL.
H: SUP. SOL.
H: TU. SOL.
H PORT
H: STOP LED
H: F.F. LED
H: REW. LED
H: STILL LED
H: PLAY LED
PINCH SOLENOID DRIVE CIRCUIT
IC6, Q9, Q10
SUPPLY SOLENOID DRIVE CIRCUIT
IC6, Q7, Q8
TAKE-UP SOLENOID DRIVE CIRCUIT
IC6, Q5, Q6
P611
P612
P613
PINCH SOLENOID
SUPPLY SOLENOID
TAKE-UP SOLENOID
FLICKER
D7
D9
D10
D11
P606
STOP LED
F.F. LED
REW. LED
STILL LED
PLAY LED
12V
60 DRIVER
OUTPUT EXPANDER
H: LONG STILL
H PORT
H: CAP. MOTOR
H: TU. TC
H: SUP. TC
H: REEL STILL
H: CAP. SEARCH
H: X15 (VR. SEARCH)
H: CAP. REV
H: DRUM MOTOR
IC 12
12 V
IC 11
P520
P510
P506
LONG STILL CMD OUT TO REEL SERVO
CAP. MOTOR CMD. OUT TO CAP. SERVO
TU. TC. CMD. OUT TO REEL SERVO
SUP. TC. CMD. OUT TO REEL SERVO
REEL STILL CMD. OUT TO REEL SERVO
CAP. SEARCH CMD. OUT TO CAP. SERVO
VR. SEARCH CMD. OUT TO CAP. SERVO
CAP. REV. CMD. OUT TO CAP. SERVO
DRUM MOTOR CMD. OUT TO DRUM SERVO
50 SYSCON

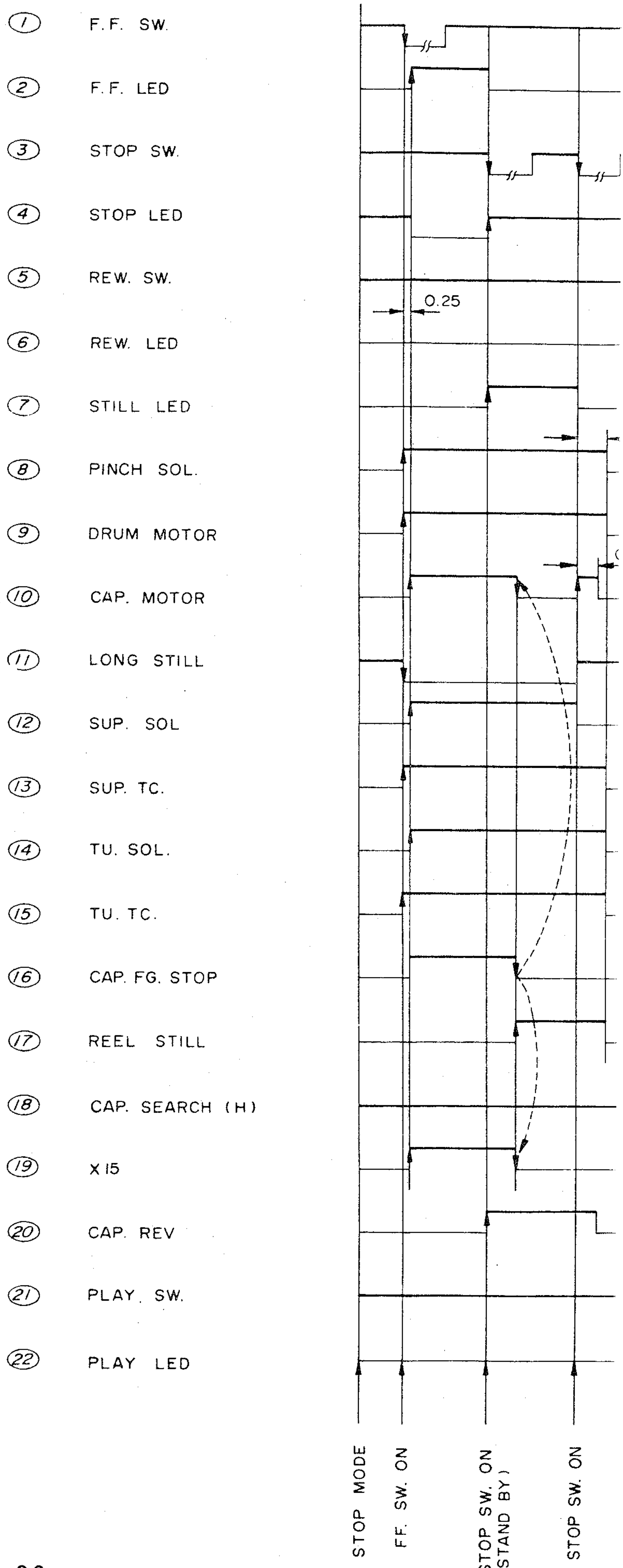
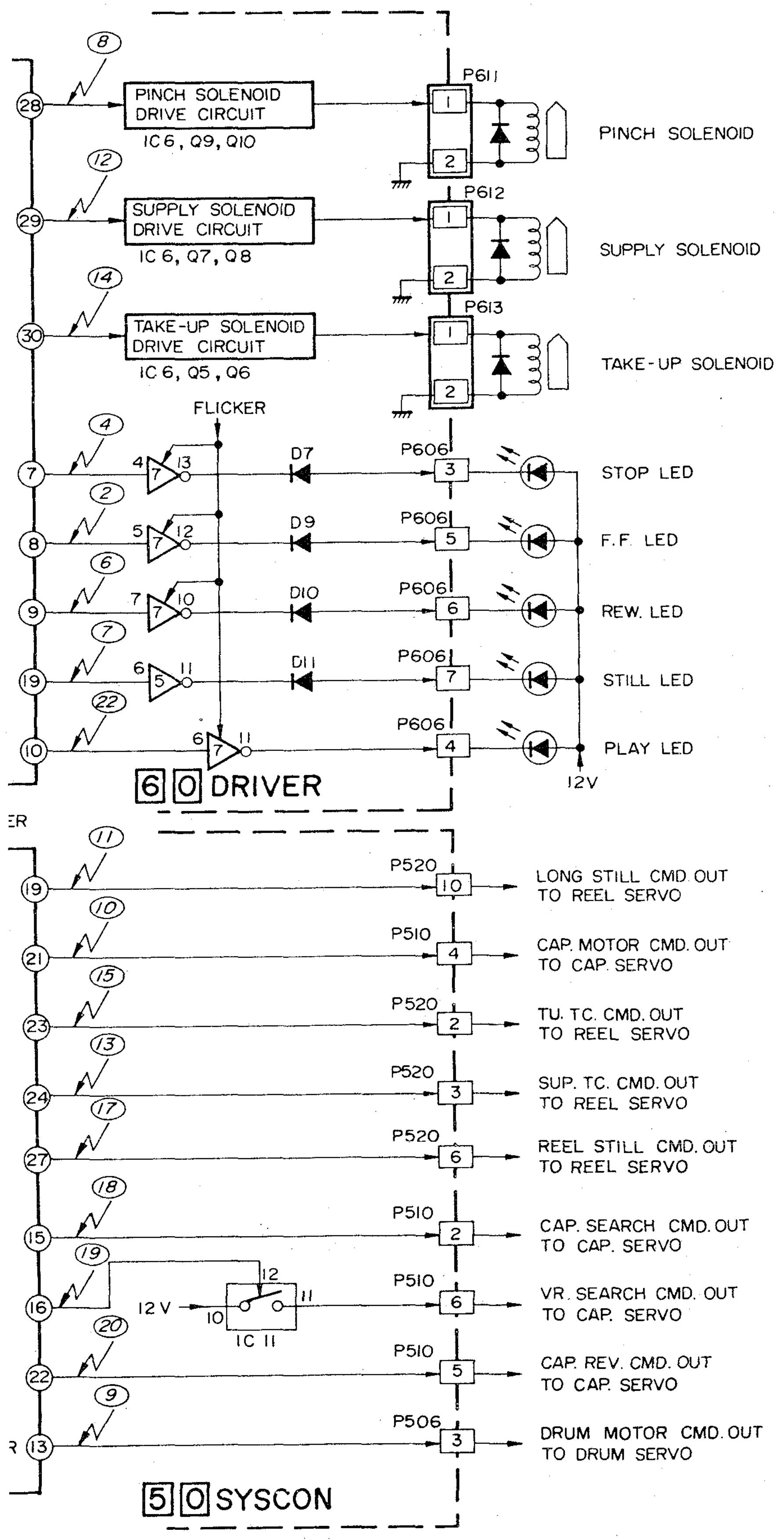


Fig. 3-6


PINCH SOLENOID DRIVE CIRCUIT
IC6, Q9, Q10
P611
PINCH SOLENOID
SUPPLY SOLENOID DRIVE CIRCUIT
IC6, Q7, Q8
P612
SUPPLY SOLENOID
TAKE-UP SOLENOID DRIVE CIRCUIT
IC6, Q5, Q6
P613
TAKE-UP SOLENOID
FLICKER
D7
P606
STOP LED
D9
F.F. LED
D10
REW. LED
D11
STILL LED
PLAY LED
12V
60 DRIVER
P520
LONG STILL CMD OUT TO REEL SERVO
P510
CAP. MOTOR CMD. OUT TO CAP. SERVO
TU. TC. CMD. OUT TO REEL SERVO
SUP. TC. CMD. OUT TO REEL SERVO
REEL STILL CMD. OUT TO REEL SERVO
CAP. SEARCH CMD. OUT TO CAP. SERVO
12 V
IC 11
VR. SEARCH CMD. OUT TO CAP. SERVO
CAP. REV. CMD. OUT TO CAP. SERVO
P506
DRUM MOTOR CMD. OUT TO DRUM SERVO
50 SYSCON
28
29
30
7
8
9
19
10
19
21
23
24
27
15
16
22
13

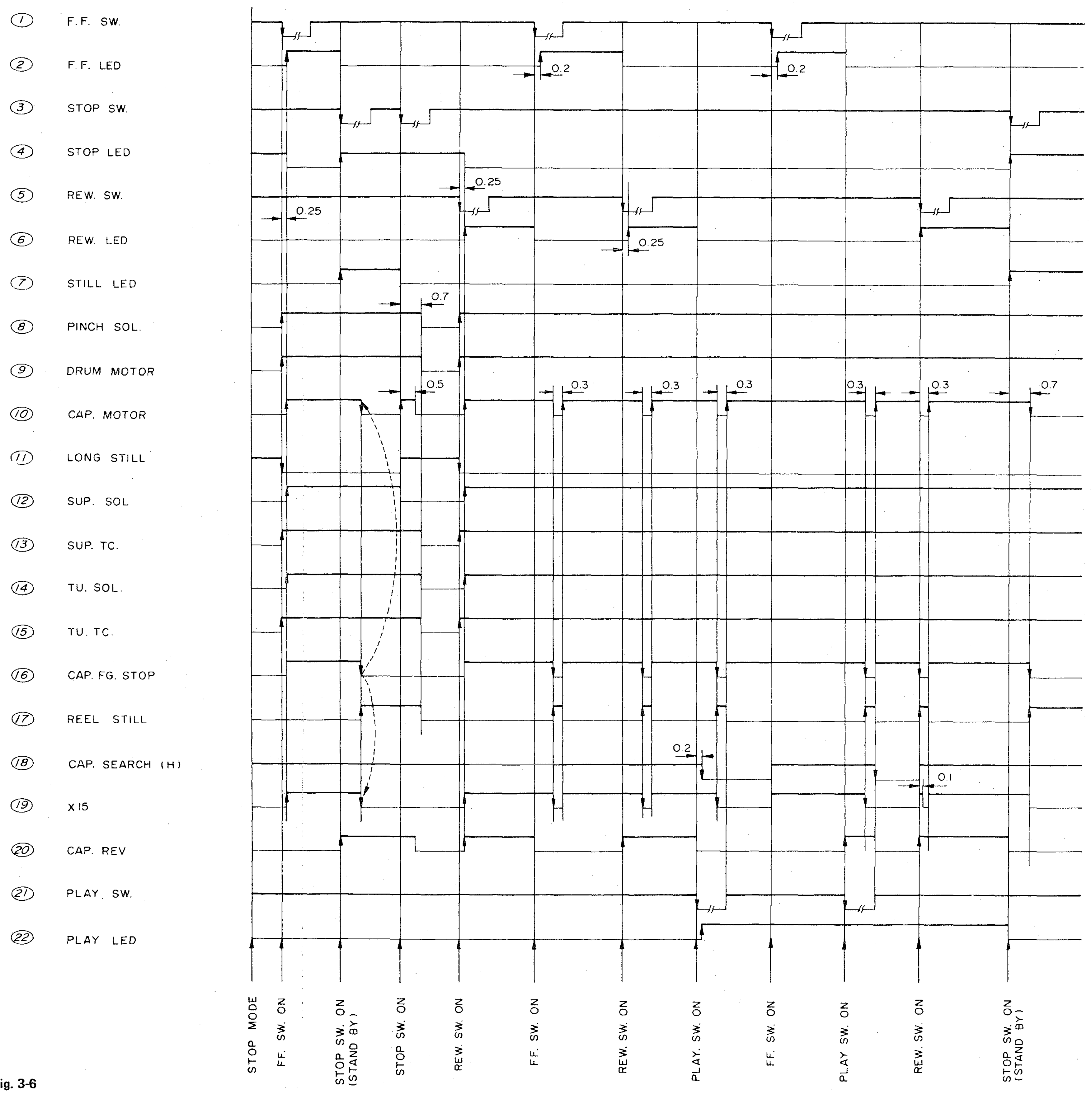

① F.F. SW.
② F.F. LED
③ STOP SW.
④ STOP LED
⑤ REW. SW.
⑥ REW. LED
⑦ STILL LED
⑧ PINCH SOL.
⑨ DRUM MOTOR
⑩ CAP. MOTOR
⑪ LONG STILL
⑫ SUP. SOL
⑬ SUP. TC.
⑭ TU. SOL.
⑮ TU. TC.
⑯ CAP. FG. STOP
⑰ REEL STILL
⑱ CAP. SEARCH (H)
⑲ X15
⑳ CAP. REV
㉑ PLAY. SW.
㉒ PLAY LED
0.2
0.25
0.7
0.5
0.3
0.1
STOP MODE
F.F. SW. ON
STOP SW. ON (STAND BY)
STOP SW. ON
REW. SW. ON
F.F. SW. ON
REW. SW. ON
PLAY. SW. ON
F.F. SW. ON
PLAY SW. ON
REW. SW. ON
STOP SW. ON (STAND BY)

Fig. 3-6

5. Eject mode

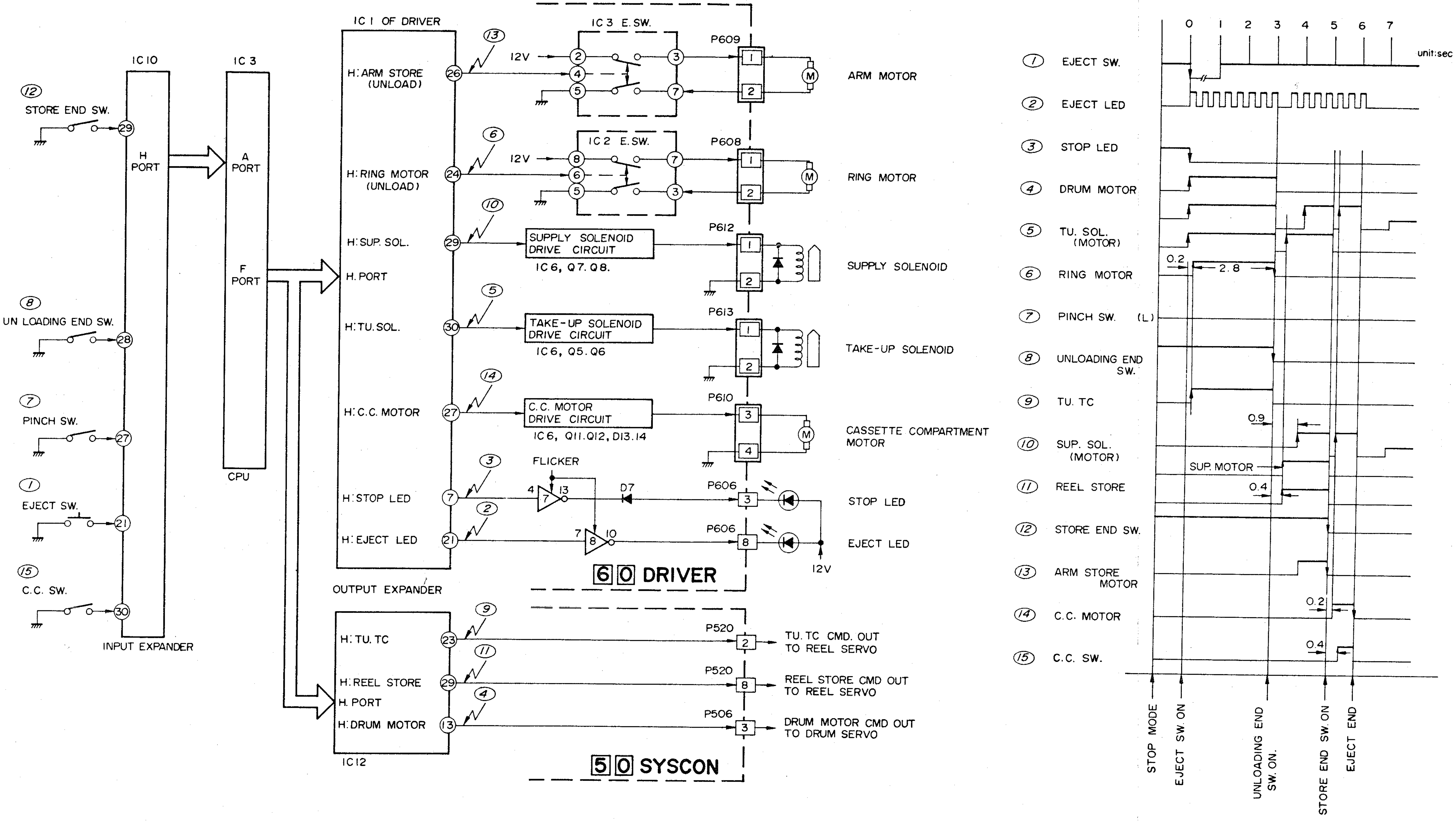

IC 10
IC 3
IC 1 OF DRIVER
IC 3 E.SW.
IC 2 E.SW.
⑫ STORE END SW.
H PORT
A PORT
F PORT
CPU
⑧ UN LOADING END SW.
⑦ PINCH SW.
① EJECT SW.
⑮ C.C. SW.
INPUT EXPANDER
OUTPUT EXPANDER
H: ARM STORE (UNLOAD)
H: RING MOTOR (UNLOAD)
H: SUP. SOL.
H. PORT
H: TU. SOL.
H: C.C. MOTOR
H: STOP LED
H: EJECT LED
12V
P609
P608
P612
P613
P610
P606
SUPPLY SOLENOID DRIVE CIRCUIT
IC6, Q7. Q8.
TAKE-UP SOLENOID DRIVE CIRCUIT
IC6, Q5. Q6
C.C. MOTOR DRIVE CIRCUIT
IC6, Q11. Q12, D13. 14
FLICKER
D7
ARM MOTOR
RING MOTOR
SUPPLY SOLENOID
TAKE-UP SOLENOID
CASSETTE COMPARTMENT MOTOR
STOP LED
EJECT LED
60 DRIVER
H: TU. TC
H: REEL STORE
H. PORT
H: DRUM MOTOR
IC12
P520
P506
TU. TC CMD. OUT TO REEL SERVO
REEL STORE CMD OUT TO REEL SERVO
DRUM MOTOR CMD OUT TO DRUM SERVO
50 SYSCON
0 1 2 3 4 5 6 7
unit:sec
① EJECT SW.
② EJECT LED
③ STOP LED
④ DRUM MOTOR
⑤ TU. SOL. (MOTOR)
⑥ RING MOTOR
⑦ PINCH SW. (L)
⑧ UNLOADING END SW.
⑨ TU. TC
⑩ SUP. SOL. (MOTOR)
⑪ REEL STORE
⑫ STORE END SW.
⑬ ARM STORE MOTOR
⑭ C.C. MOTOR
⑮ C.C. SW.
0.2
2.8
0.9
SUP. MOTOR
0.4
0.2
0.4
STOP MODE
EJECT SW. ON
UNLOADING END SW. ON.
STORE END SW. ON
EJECT END

Fig. 3-7

3.1.8 Specifications for IC7 (CPU) LM6416E-131

1. IC7 controls the mode control signals at time of editing according to the drum flip-flop timing.

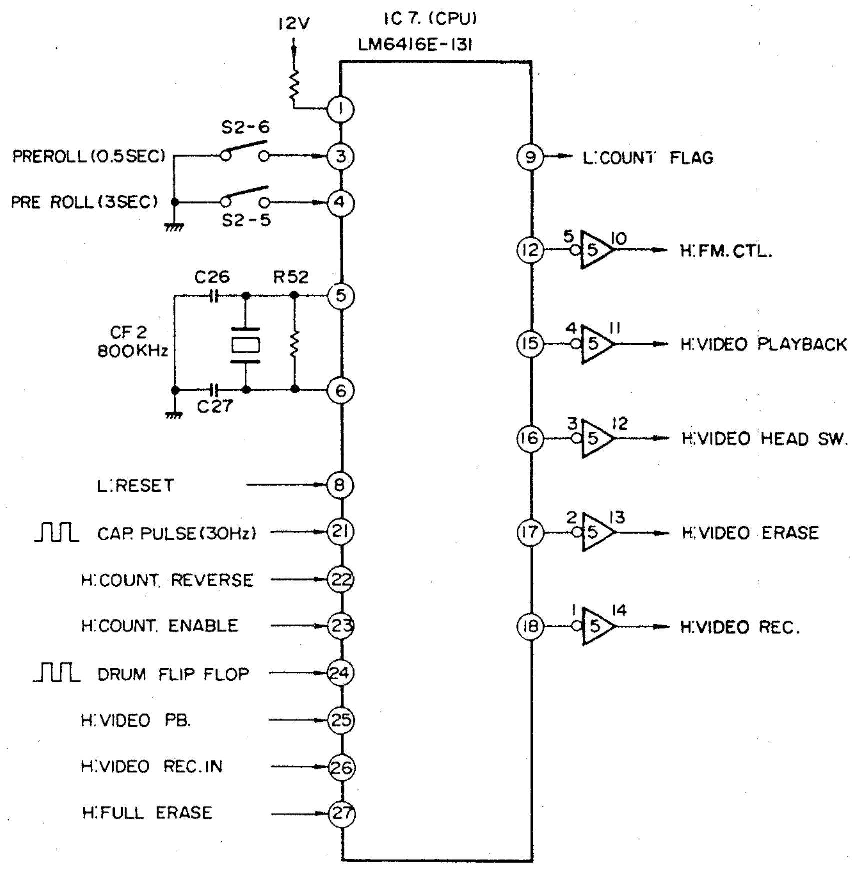
- Use: 4-bit microcomputer for control purpose
- Configuration: N channel E/D MOS LST
- Internal Function: Has the functions of a single-chip 4-bit microcomputer including a 1024 x 8-bit ROM (for program) and 64 x 4-bit RAM (for data memory).

2. Functions of Terminals

Terminal Name	I/O	Function
$\overline{INT}$	I	Psuedo interruption request input terminal
$\overline{RES}$	I	Reset input terminal
$PA_{0\sim3}$	I	Input Port $A_0 \sim A_3$ At time of input, a bit test with 4-bit input can be made.
$PC_{0\sim3}$	I/O	Input/output port $C_0 \sim C_3$ At time of input, a bit test with 4-bit input can be made. At time of output, a bit set/reset with 4-bit output can be made and furthermore, immediate data can be sent out.
$PD_{0\sim3}$	I/O	Input/output port $D_0 \sim D_3$ At time of input, a bit test with 4-bit input can be made. At time of output, a bit set/reset with 4-bit output can be made and furthermore, immediate data can be sent out.
$PE_{0\sim3}$	O	Output port $E_0 \sim E_3$ A bit set/reset with 4-bit output can be made.
$PF_{0\sim3}$	O	Output port $F_0 \sim F_3$ A bit set/reset with 4-bit output can be made.
PG_0	O	Output port G_0 A time of output, a bit set/reset with a single bit output can be made.
Xtal	I/O	Terminal externally mounted to the resonance circuit for internal clock oscillation. This terminal and the EXtal terminal are used with a ceramic oscillator, CR, etc. connected.
EXtal	I	Terminal operated by supplying external clock. When internal clock oscillation is used, this terminal is used together with the Xtal terminal with a ceramic oscillator, CR, etc. connected.
V_{DD}	I	Power terminal. This terminal is normally connected to +5 V.
V_{SS}	–	This terminal is connected to 0 V of the power source.
TEST	I	LSI test terminal. Normally connected to V_{SS} 0 V.

Table 3-4

3. Edit timing chart


12V
IC 7. (CPU)
LM6416E-131
S2-6
PREROLL (0.5SEC)
PRE ROLL (3SEC)
S2-5
C26
R52
CF 2
800KHz
C27
L:RESET
CAP. PULSE (30Hz)
H:COUNT. REVERSE
H:COUNT. ENABLE
DRUM FLIP FLOP
H:VIDEO PB.
H:VIDEO REC. IN
H:FULL ERASE
1
3
4
5
6
8
21
22
23
24
25
26
27
9
L:COUNT FLAG
12
H:FM. CTL.
15
H:VIDEO PLAYBACK
16
H:VIDEO HEAD SW.
17
H:VIDEO ERASE
18
H:VIDEO REC.
5
10
4
11
3
12
2
13
1
14

SETTING OF PREROLL TIME

S2-6	OFF	OFF	ON	ON
S2-5	OFF	ON	OFF	ON
TIME (SEC)	2.4	3	0.5	5

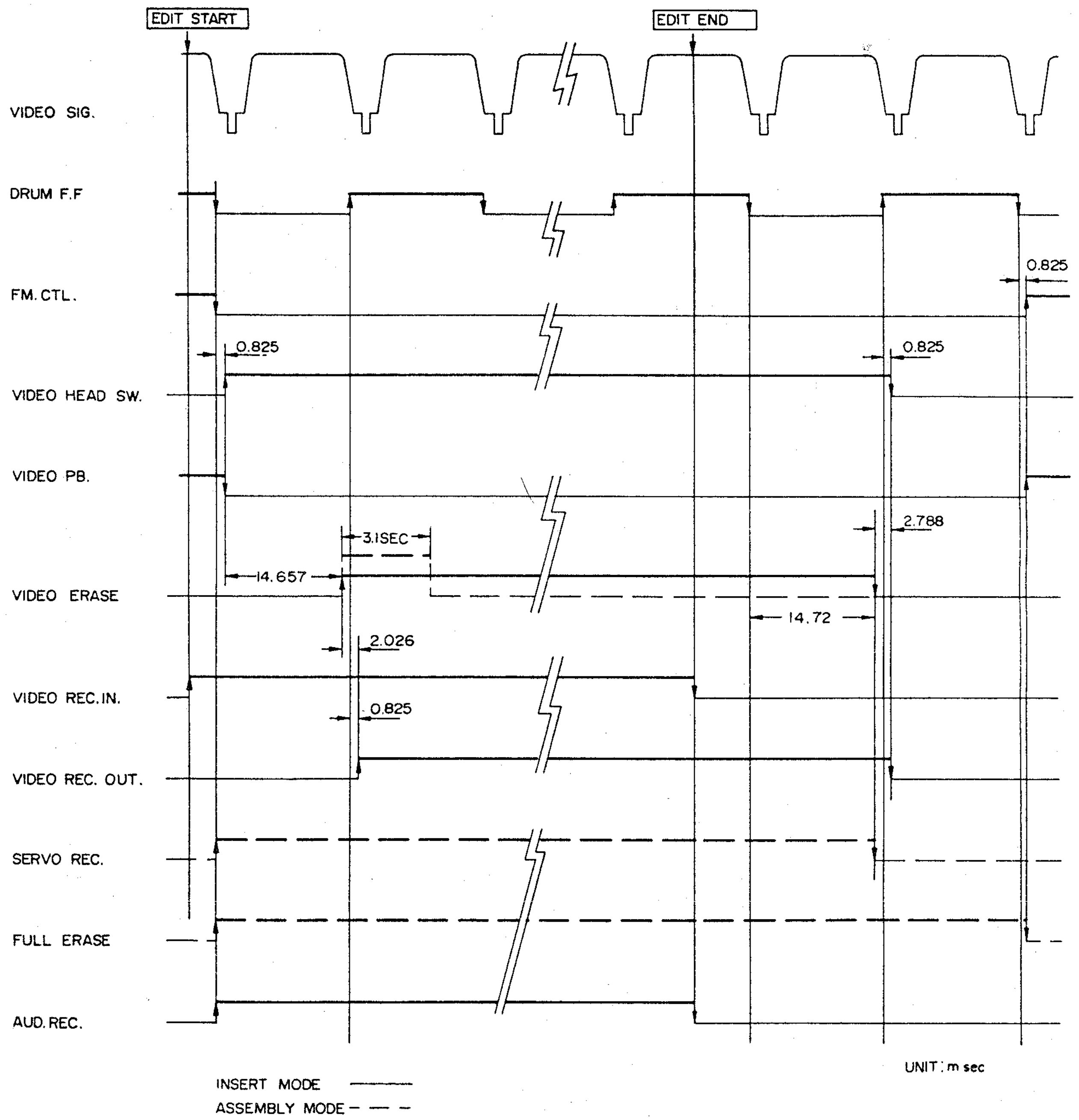


Fig. 3-8

3.1.9 Dip switch description (S2-1 to 8)

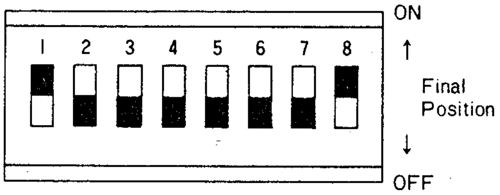


Fig. 3-9

1. S2-1: Enables ON/OFF operation of the emergency mode. When this switch is OFF, the warning LED does not light even when the drum stops in the play mode.
2. S2-2: Selects length of time, on position yields the shorter time period.
3. S2-3: Enables ON/OFF operation of the eject operation. When this switch is ON, a cassette tape can be ejected in all modes.
4. S2-4: Enables automatic ON/OFF operation of editing. When this switch is ON, editing is automatically released at the counter reading "00:00".
   (The auto mode switch is set to SEARCH the counter of the set only operates.)
5. S2-5, S2-6: Setting of pre-roll time

S2-5	OFF	OFF	ON	ON
S2-6	OFF	ON	OFF	ON
Time	2.4 sec	0.5 sec	3 sec	5 sec

*If the pre-roll time is set at 0.5 sec., the editing point is disordered.

Table 3-5

(These switches should be operated only after the power switch is turned OFF.)

6. S2-7: Enables ON/OFF operation of the auto rewind operation. When this switch is OFF, if the tape end is reached in the play mode, the mode is shifted to stop mode. (The auto mode switch is turned OFF.) When ON, if the tape end is reached in the play mode, the mode is automatically shifted to rewind mode.
7. S2-8: When this switch is ON, it becomes possible to directly shift the operation mode to search mode from the stop mode or vice versa by the remote control unit. When this switch is OFF, it is not possible to shift to search mode even when the search dial of the remote control unit is rotated.

3.1.10 Drum stop detection circuit

1. When the drum rotates normally:
   Drum pulse (30 Hz) from the drum circuit board is supplied through Pin 2 of Connector P506 to Pin 5 of IC5.
   This drum pulse is differentiated by R66 and C9 through the inverter (IC5) of the open collector.
   This differential voltage is used as control signal of charging and discharging the capacitor C10 through IC1. Further, R67 is a discharging resistor. Charging voltage of C10 is charged and discharged within the threshold voltage (time constant of R69 and C10; 4—10 sec.) (approx. 5 V) and therefore, Pin 8 of IC6 becomes high level.
2. When the drum rotation becomes slow:
   When the drum rotation becomes slow, high or low level voltage is supplied to Pin 5 of IC5 according to condition of the drum flip-flop. This high or low level voltage is then supplied to Capacitor C9 through the inverter (IC5) of the open collector and R66. As this capacitor (C9) cuts DC component, Pin 6 of IC1 is always kept at low level. This low level voltage is turned to high level by the inverter (IC1) and charged to the capacitor (C10).
   If this charging voltage exceeds the threshold voltage (time constant of R69 and C10; 4—10 sec.) (approx. 5V), Pin 8 of IC6 becomes low level, thus interrupting the microcomputer. (Warning mode is engaged.)
3. Drum motor stop (Play — Stop — Play):
   When the stop switch is pressed in the play mode, Pin 13 of IC12 becomes low level and Q4 is cut off. 10 V is supplied through the diode (D22) to Pin 6 of IC1 and is turned to low level by the inverter (IC1). Charged voltage of the capacitor (C10) is discharged through R67 and therefore, Pin 8 of IC6 becomes high level and warning mode is not engaged.

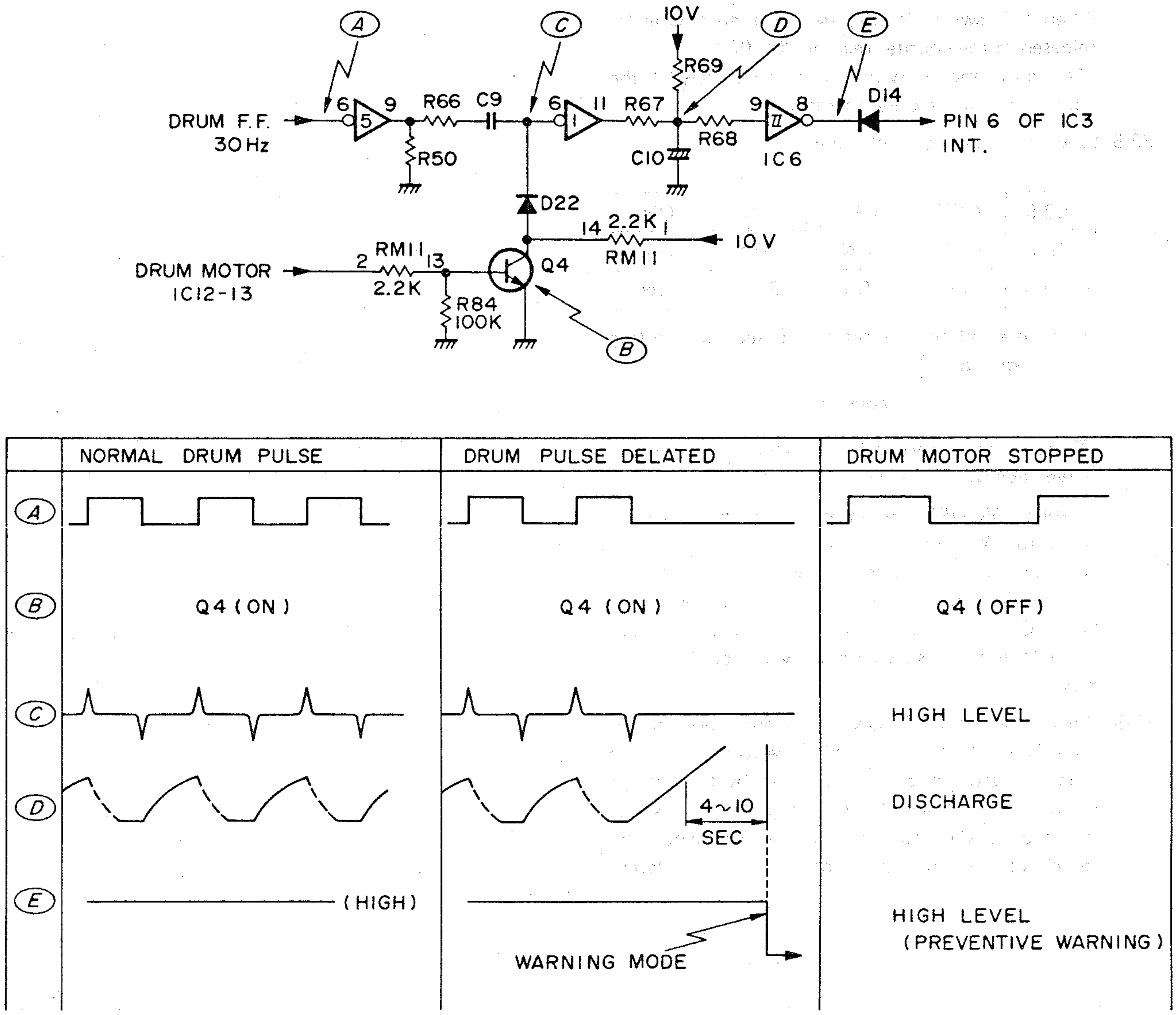

A
C
10V
D
E
DRUM F.F. 30Hz
6
5
9
R66
C9
R50
6
1
11
R67
R69
C10
9
II
8
R68
IC6
D14
PIN 6 OF IC3 INT.
D22
14
2.2K
1
RM11
10 V
DRUM MOTOR IC12-13
2
RM11
13
2.2K
R84
100K
Q4
B
NORMAL DRUM PULSE
DRUM PULSE DELATED
DRUM MOTOR STOPPED
A
B
Q4 (ON)
Q4 (ON)
Q4 (OFF)
C
HIGH LEVEL
D
4~10 SEC
DISCHARGE
E
(HIGH)
WARNING MODE
HIGH LEVEL (PREVENTIVE WARNING)

Fig. 3-10

3.1.11 Capstan stop detection circuit

1. When the capstan rotates normally:
   Capstan FG signal (450 Hz) from the capstan circuit board is supplied through Pin 6 of Connector P502 to Capacitor C7 where it is then differentiated. This differential voltage serves as control signal for charging and discharging Capacitor C6 through IC1. Further, R27 is a discharging resistor.
   Charged voltage of C6 is charged and discharged within a fixed voltage (approx. 8 V) which is divided by Resistors R22 and R19 and therefore, Pin 1 of IC8 becomes high level.

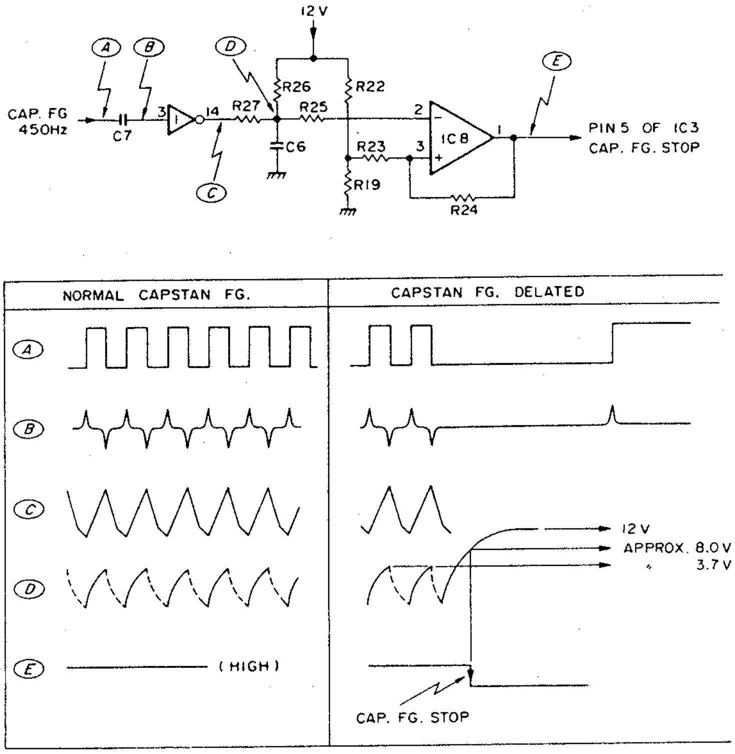

12V
A
B
D
E
C
CAP. FG 450Hz
C7
R26
R27
R25
R22
C6
R23
R19
R24
IC8
PIN 5 OF IC3 CAP. FG. STOP
NORMAL CAPSTAN FG.
CAPSTAN FG. DELATED
(HIGH)
12 V
APPROX. 8.0 V
3.7 V
CAP. FG. STOP

Fig. 3-11

2. When capstan rotation pulse separation exceeds a certain value:
   When the capstan rotation pulse separation becomes longer, high or low level voltage is supplied to the capacitor (C7) according to condition of the capstan FG. As the capacitor (C9) cuts DC component, Pin 3 of IC1 is always kept at low level. This low level voltage is turned to high level by the inverter (IC1) and charged to the capacitor C6. If this charged voltage exceeds a fixed voltage (approx. 8 V) which is divided by Resistors R22 and R19, Pin 1 of IC8 becomes low level to detect stop of the capstan FG. For instance, when the REW switch is pressed in the FF mode, how long inverse voltage (X15) is to be applied is determined by the output voltage from IC8. See Timing Charts, Fig. 3-7 and 3-12.

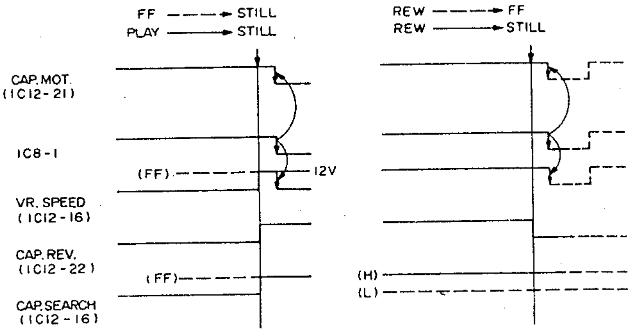

FF → STILL
PLAY → STILL
REW → FF
REW → STILL
CAP. MOT. (IC12-21)
IC8-1
(FF)
12V
VR. SPEED (IC12-16)
CAP. REV. (IC12-22)
(FF)
(H)
(L)
CAP. SEARCH (IC12-16)

Fig. 3-12

3.1.12 Search speed control circuit

1. Remote control
   With the remote control connected, turning the search dial supplies linear voltage to connector P519 pin 10. This linear voltage is an analog voltage which changes linearly from still to 5 the normal speed (9.6 V). This voltage is supplied to the capstan servo via IC11 (pins 8 & 9) as the search speed voltage (0 – 5 times the normal speed).
   Non-inverting input (pin 6) voltage of IC8, however, is set to maximum voltage (approx. 9.6 V) by means of variable resistors R20, R36 and R37 (threshold voltage adjust) and output voltage (pin 7) of IC8 changes from low to high level when inverting input (pin 5) voltage of IC8 is at approx. 9.6 V, and is supplied to IC11 via diodes D9 and D8 and the inverter (IC6). As a result, IC11 pin 6 becomes low and is switched OFF. On the other hand, IC11 pin 12 becomes high and is switched ON to supply 12 V fixed voltage (15 times the normal speed) to the capstan servo as the search speed voltage.

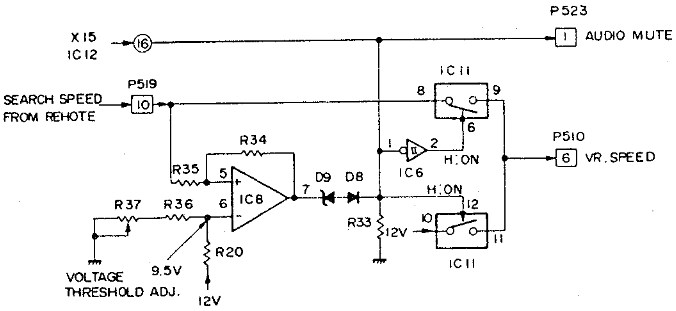

X15 IC12
16
P523
1 AUDIO MUTE
SEARCH SPEED FROM REMOTE
P519
10
IC11
8
9
6
R34
R35
5
6
IC8
7
D9
D8
IC6
1
2
H: ON
H: ON
12
10
11
R33
12V
IC11
P510
6 VR. SPEED
R37
R36
R20
VOLTAGE THRESHOLD ADJ.
9.5V
12V

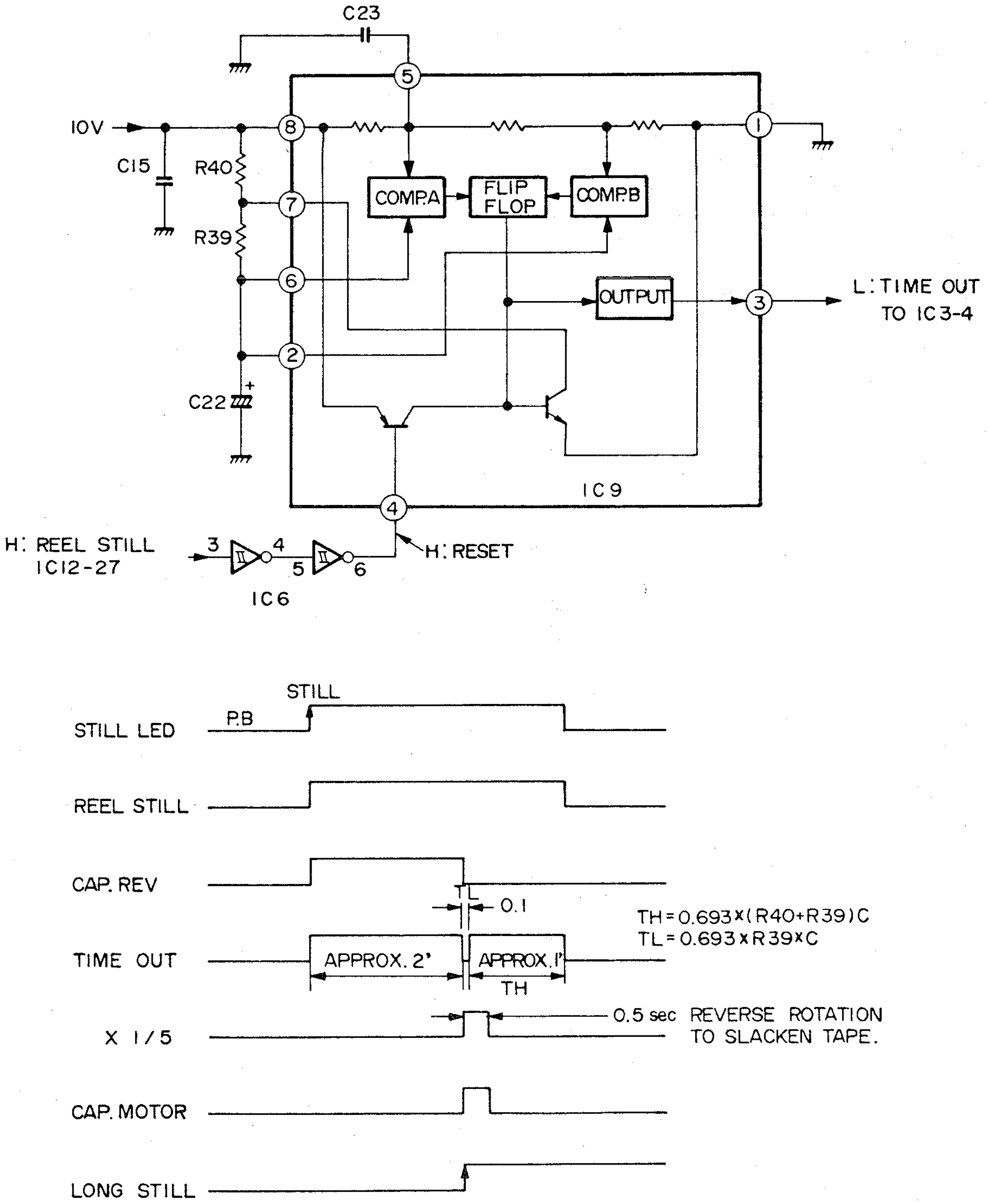
Fig. 3-13

3.1.13 Long still timer circuit (IC9 HA17555PS)

As it is not preferable, in consideration of the tape as well as the head, to leave the set in the still mode for a long time, approx. 2 min. after the set is placed in the still mode using the non-stable multiplexer of IC9, a long still command is generated to slacken tension of the tape at the supply reel side of the reel servo. Approx. 1 min. later, the still mode is shifted to the stop mode. (Time constant R40, R39, C22)

1. Description of IC9 (HA17555PS)
   The HA17555PS is an IC capable of causing an accurate time lag or oscillation.
   In the non-stable operation, oscillation frequency and duty cycle can be controlled separately by two external resistances and one external capacitance. When the resistor R39 is added and pins 6 and 2 are connected, this IC serves as a non-stable circuit. The timing chart is shown in Fig. 3-4.

- Reference voltage circuit
  Supply voltage is divided into three parts by equal resistances; 2/3 VCC is connected to comparator A and 1/3 VCC to comparator B.
  Further 2/3 VCC is pulled out as a control terminal and applying external bias to this terminal can change the threshold level and trigger level of the comparators.
- Comparator A
  This comparator is connected to reference voltage 2/3 VCC and is switched if voltage at the threshold terminal exceeds 2/3 VCC. In other words, if voltage of the threshold terminal exceeds 2/3 VCC, the flip-flop is reset.
- Comparator B
  This comparator is connected to reference voltage 1/3 VCC and is switched if voltage at the trigger terminal drops below 1/3 VCC. In other words, if voltage at the trigger terminal drops below 1/3 VCC, the flip-flop is reset.
- Flip-flop
  This is an RS flip-flop consisting of a transistor and a resistor. This flip-flop is kept stable in reset state by a reset signal from Comparator A and also, is kept stable in reset state by a reset signal from Comparator B.
- Output signal
  The output level is determined; high or low, according to the state of output from the flip-flop.
- Reset
  The reset function places the reset terminal at low level in preference to all other input signals, thus providing the starting point of a new cycle.
- Discharge
  Switching Q2 ON/OFF discharges and charges timing constant connected to both of these terminals.


C23
10V
C15
R40
R39
C22
5
8
7
6
2
1
3
4
COMP.A
FLIP FLOP
COMP.B
OUTPUT
IC9
L: TIME OUT
TO IC3-4
H: REEL STILL
IC12-27
3
4
5
6
IC6
H: RESET
STILL
P.B
STILL LED
REEL STILL
CAP. REV
TL
0.1
TH=0.693×(R40+R39)C
TL=0.693×R39×C
TIME OUT
APPROX. 2'
APPROX. 1'
TH
X 1/5
0.5 sec REVERSE ROTATION
TO SLACKEN TAPE.
CAP. MOTOR
LONG STILL

LONG STILL

Fig. 3-14

3.1.14 Pause and pre-roll

When the REC and PLAY buttons are simultaneously pressed during the play, recording mode results. When the PAUSE button is pressed during recording, after tape rewind for approx. 2.4 sec, pause results.

When the PLAY button is again pressed during the pause state, after tape forwarding for 2.4 sec, recording mode results. There is therefore no disturbance at the junction point (editing point) between recordings. Tape rewind at this time is called Pre-Roll. (When the pre-roll button is pressed by means of the remote control unit, however, the tape rewind for 5 sec. in consonance with AD is called Pre-Roll. In this case, rewind the tape for 4 sec. out of 5 sec. rewinding by X2 and the remaining one sec. by X1/5.) When the STILL button is pressed during the play, the capstan motor stops and still mode results.

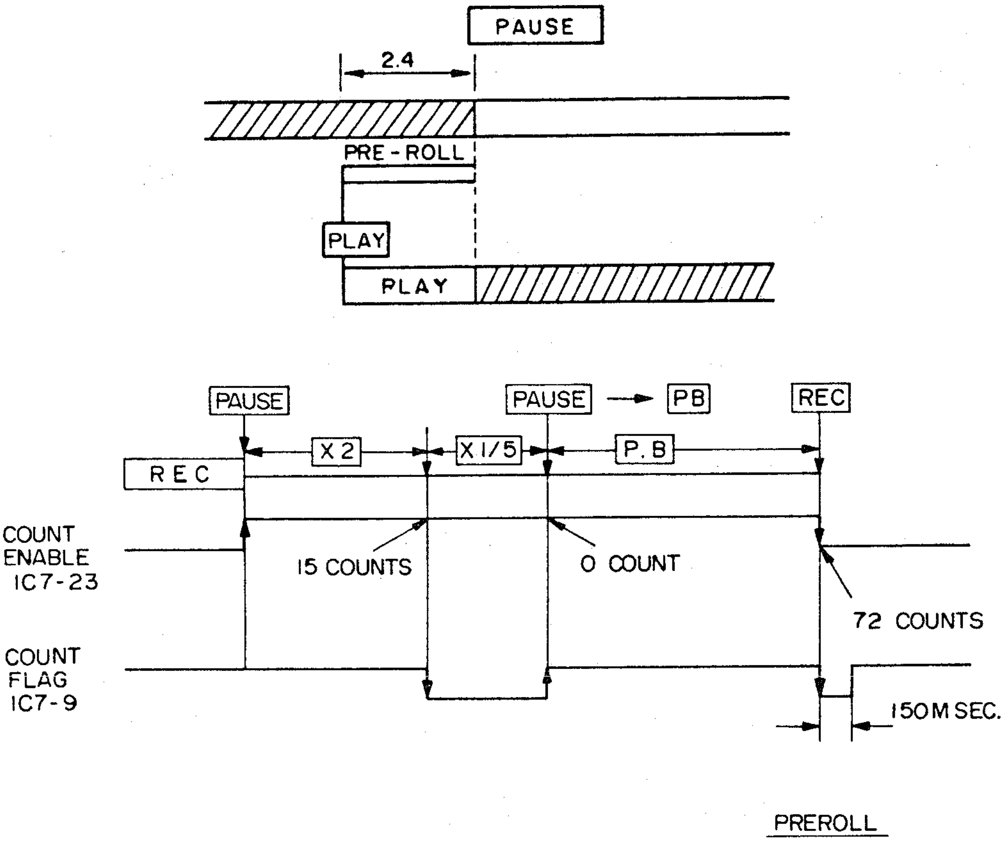

PAUSE
2.4
PRE-ROLL
PLAY
PLAY
PAUSE
PAUSE
PB
REC
X 2
X 1/5
P. B
REC
COUNT ENABLE IC7-23
15 COUNTS
0 COUNT
72 COUNTS
COUNT FLAG IC7-9
150M SEC.
PREROLL

Fig. 3-15

3.1.15 Mode shift

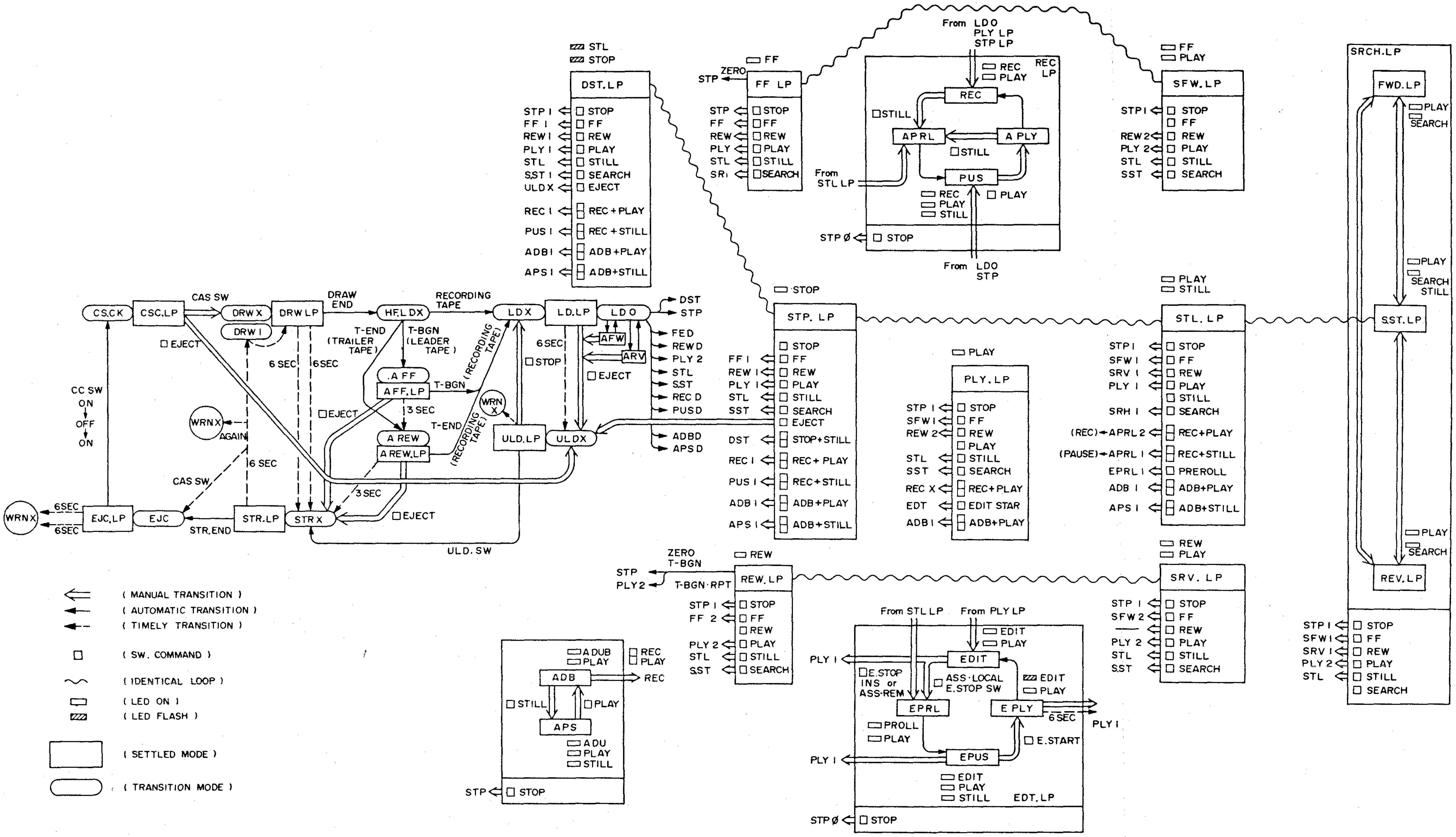

CS.CK
CSC.LP
CAS SW
DRW X
DRW LP
DRW I
DRAW END
HF.LD X
RECORDING TAPE
LDX
LD.LP
LDO
DST
STP
FED
REWD
PLY 2
STL
SST
REC D
PUSD
ADBD
APSD
AFW
ARV
6 SEC
☐ STOP
☐ EJECT
T-END (TRAILER TAPE)
T-BGN (LEADER TAPE)
A FF
AFF.LP
T-BGN
3 SEC
A REW
AREW.LP
T-END
(RECORDING TAPE)
WRN X
ULD.LP
ULDX
ULD.SW
CC SW ON OFF ON
WRNX
AGAIN
CAS SW
6 SEC
3 SEC
EJC.LP
EJC
STR.LP
STR X
STR.END
6SEC
6SEC
WRNX
☐ EJECT
▨ STL
▨ STOP
DST.LP
STP I ☐ STOP
FF I ☐ FF
REW I ☐ REW
PLY I ☐ PLAY
STL ☐ STILL
SST I ☐ SEARCH
ULD X ☐ EJECT
REC I REC+PLAY
PUS I REC+STILL
ADB I ADB+PLAY
APS I ADB+STILL
▭ FF
ZERO
STP
FF LP
STP ☐ STOP
FF ☐ FF
REW ☐ REW
PLY ☐ PLAY
STL ☐ STILL
SRI ☐ SEARCH
From LDO PLY LP STP LP
▭ REC
▭ PLAY
REC LP
REC
☐ STILL
APRL
A PLY
☐ STILL
From STL LP
PUS
▭ REC
▭ PLAY
▭ STILL
☐ PLAY
STP Ø ☐ STOP
From LDO STP
▭ FF
▭ PLAY
SFW.LP
STP I ☐ STOP
☐ FF
REW 2 ☐ REW
PLY 2 ☐ PLAY
STL ☐ STILL
SST ☐ SEARCH
SRCH.LP
FWD.LP
▭ PLAY
▭ SEARCH
▭ PLAY
▭ SEARCH
STILL
SST.LP
▭ PLAY
▭ SEARCH
REV.LP
STP I ☐ STOP
SFW I ☐ FF
SRV I ☐ REW
PLY 2 ☐ PLAY
STL ☐ STILL
☐ SEARCH
▭ STOP
STP. LP
FF I ☐ FF
REW I ☐ REW
PLY I ☐ PLAY
STL ☐ STILL
SST ☐ SEARCH
☐ STOP
☐ EJECT
DST STOP+STILL
REC I REC+PLAY
PUS I REC+STILL
ADB I ADB+PLAY
APS I ADB+STILL
▭ PLAY
PLY.LP
STP I ☐ STOP
SFW I ☐ FF
REW 2 ☐ REW
☐ PLAY
STL ☐ STILL
SST ☐ SEARCH
REC X REC+PLAY
EDT ☐ EDIT STAR
ADB I ADB+PLAY
▭ PLAY
▭ STILL
STL. LP
STP I ☐ STOP
SFW I ☐ FF
SRV I ☐ REW
PLY I ☐ PLAY
☐ STILL
SRH I ☐ SEARCH
(REC)←APRL 2 REC+PLAY
(PAUSE)←APRL I REC+STILL
EPRL I ☐ PREROLL
ADB I ADB+PLAY
APS I ADB+STILL
ZERO T-BGN
STP
PLY2
T-BGN·RPT
▭ REW
REW. LP
STP I ☐ STOP
FF 2 ☐ FF
☐ REW
PLY 2 ☐ PLAY
STL ☐ STILL
SST ☐ SEARCH
▭ REW
▭ PLAY
SRV. LP
STP I ☐ STOP
SFW 2 ☐ FF
☐ REW
PLY 2 ☐ PLAY
STL ☐ STILL
SST ☐ SEARCH
▭ ADUB
▭ PLAY
☐ REC
☐ PLAY
ADB
REC
☐ STILL
☐ PLAY
APS
▭ ADU
▭ PLAY
▭ STILL
STP ☐ STOP
From STL LP
From PLY LP
▭ EDIT
▭ PLAY
EDIT
PLY I
☐ E.STOP INS or ASS·REM
☐ ASS·LOCAL E.STOP SW
▨ EDIT
▭ PLAY
EPRL
E PLY
6 SEC
PLY I
▭ PROLL
▭ PLAY
☐ E.START
PLY I
EPUS
▭ EDIT
▭ PLAY
▭ STILL
EDT.LP
STP Ø ☐ STOP
(MANUAL TRANSITION)
(AUTOMATIC TRANSITION)
(TIMELY TRANSITION)
☐ (SW. COMMAND)
〜 (IDENTICAL LOOP)
▭ (LED ON)
▨ (LED FLASH)
(SETTLED MODE)
(TRANSITION MODE)

Fig. 3-16

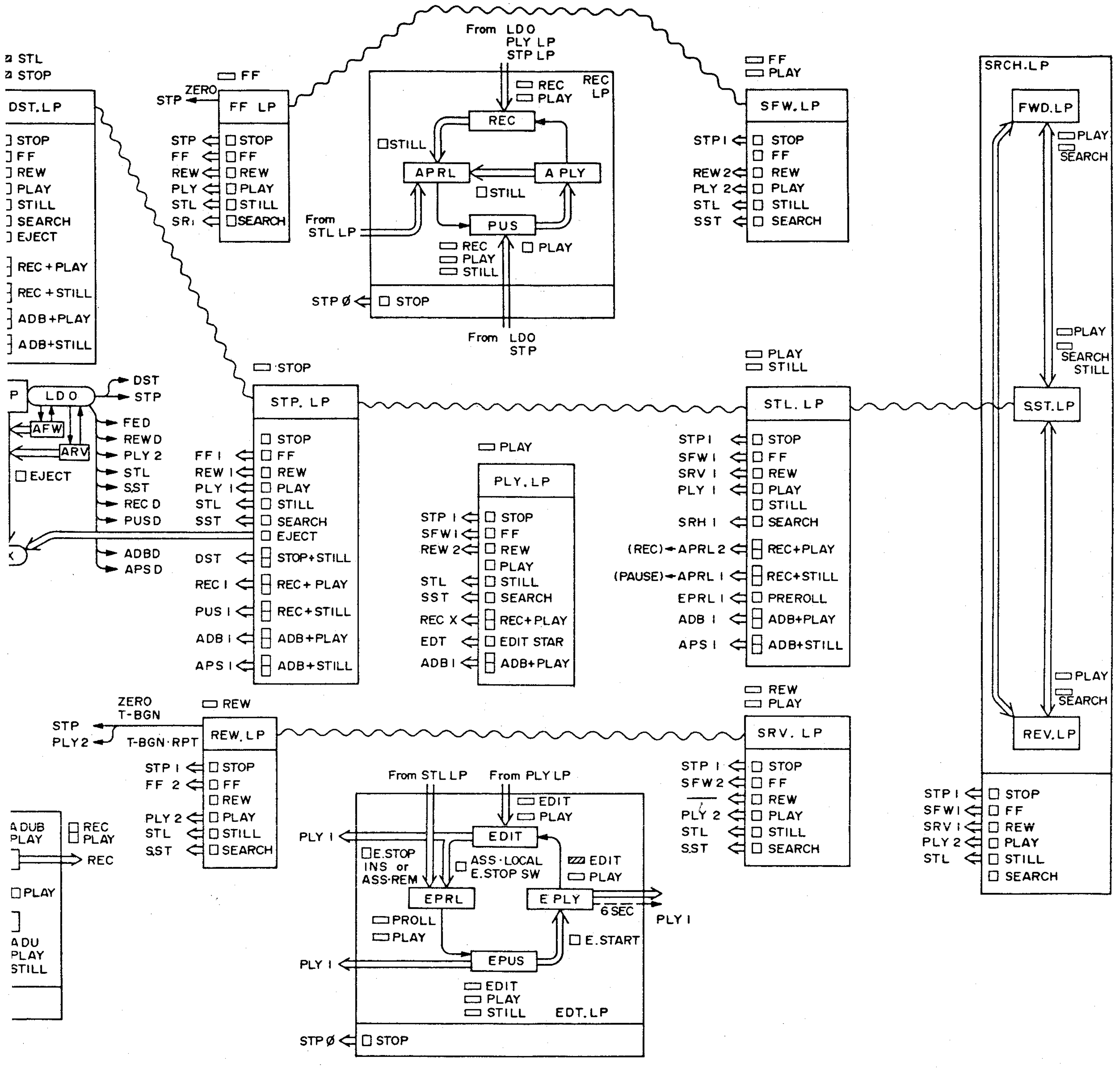

STL
STOP
DST.LP
STOP
FF
REW
PLAY
STILL
SEARCH
EJECT
REC+PLAY
REC+STILL
ADB+PLAY
ADB+STILL
LDO
AFW
ARV
DST
STP
FED
REWD
PLY 2
STL
SST
REC D
PUSD
ADBD
APSD
EJECT
FF
ZERO
STP
FF LP
STP
FF
REW
PLY
STL
SRı
STOP
FF
REW
PLAY
STILL
SEARCH
From LDO
PLY LP
STP LP
REC
PLAY
REC LP
REC
STILL
APRL
A PLY
STILL
From STL LP
PUS
REC
PLAY
STILL
PLAY
STPØ
STOP
From LDO
STP
FF
PLAY
SFW.LP
STP I
REW 2
PLY 2
STL
SST
STOP
FF
REW
PLAY
STILL
SEARCH
SRCH.LP
FWD.LP
PLAY
SEARCH
PLAY
SEARCH
STILL
SST.LP
PLAY
SEARCH
REV.LP
STP I
SFW I
SRV I
PLY 2
STL
STOP
FF
REW
PLAY
STILL
SEARCH
STOP
STP. LP
FF I
REW I
PLY I
STL
SST
DST
REC I
PUS I
ADB I
APS I
STOP
FF
REW
PLAY
STILL
SEARCH
EJECT
STOP+STILL
REC+ PLAY
REC+STILL
ADB+PLAY
ADB+STILL
PLAY
PLY. LP
STP I
SFW I
REW 2
STL
SST
REC X
EDT
ADB I
STOP
FF
REW
PLAY
STILL
SEARCH
REC+PLAY
EDIT STAR
ADB+PLAY
PLAY
STILL
STL. LP
STP I
SFW I
SRV I
PLY I
SRH I
(REC)←APRL 2
(PAUSE)←APRL I
EPRL I
ADB I
APS I
STOP
FF
REW
PLAY
STILL
SEARCH
REC+PLAY
REC+STILL
PREROLL
ADB+PLAY
ADB+STILL
ZERO
T-BGN
STP
PLY2
T-BGN·RPT
REW
REW. LP
STP I
FF 2
PLY 2
STL
SST
STOP
FF
REW
PLAY
STILL
SEARCH
A DUB
PLAY
REC
PLAY
REC
PLAY
ADU
PLAY
STILL
From STL LP
From PLY LP
EDIT
PLAY
PLY I
EDIT
E.STOP
INS or
ASS·REM
ASS·LOCAL
E.STOP SW
EDIT
PLAY
EPRL
E PLY
6 SEC
PLY I
PROLL
PLAY
E.START
PLY I
EPUS
EDIT
PLAY
STILL
EDT. LP
STPØ
STOP
REW
PLAY
SRV. LP
STP I
SFW 2
PLY 2
STL
SST
STOP
FF
REW
PLAY
STILL
SEARCH

Fig. 3-16

3.1.16 How to read the flowchart

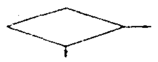
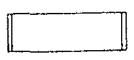
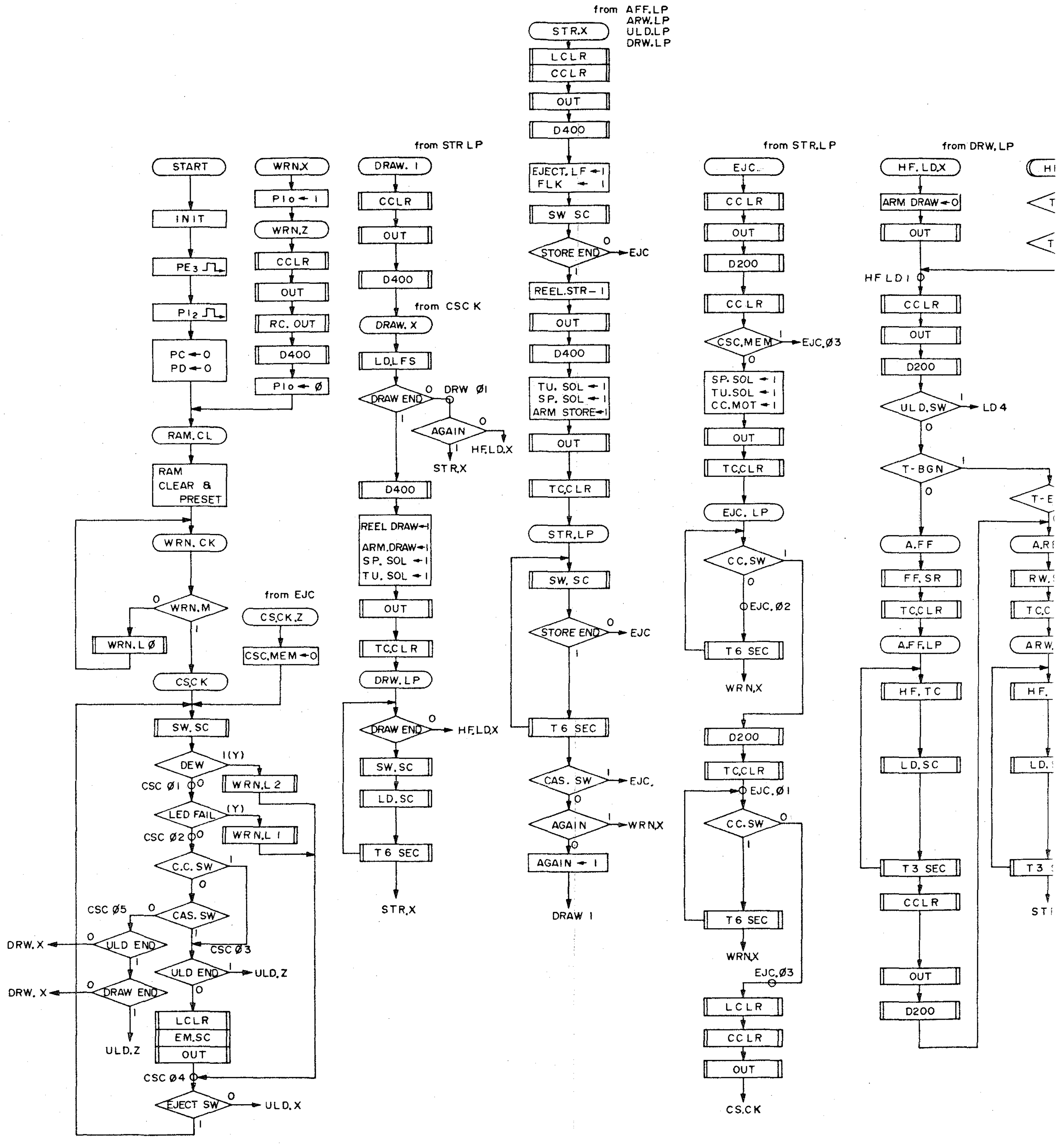
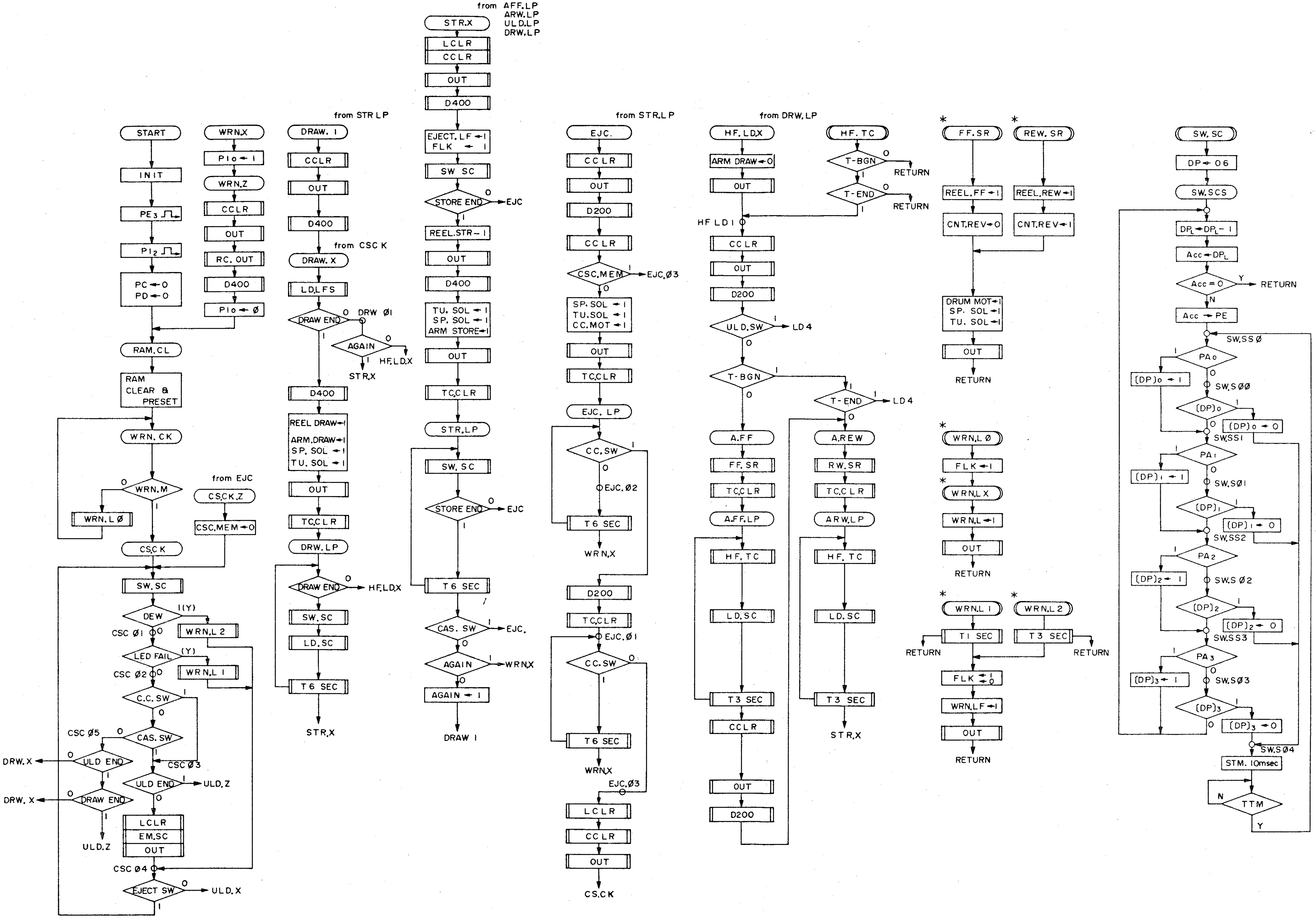
Symbol	Name	Contents
	Label	Designates the type of operation to be performed.
	Operation	Indicates an operation to be performed by the microcomputer.
	Decision instruction	Indicates that a decision (usually yes or no) is to be made by microcomputer.
	Subroutine	Indicates performance of a subroutine.

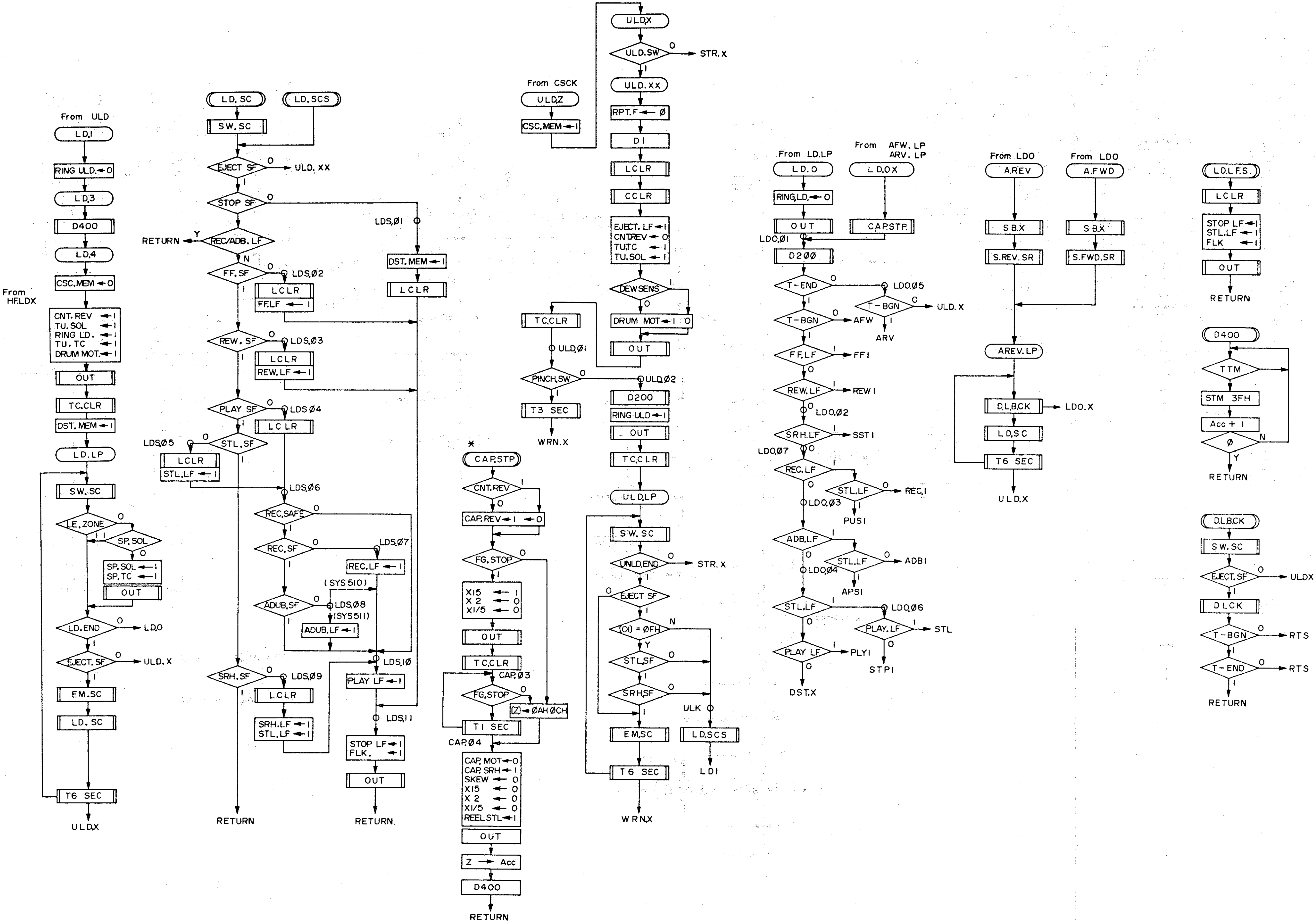
Fig. 3-17

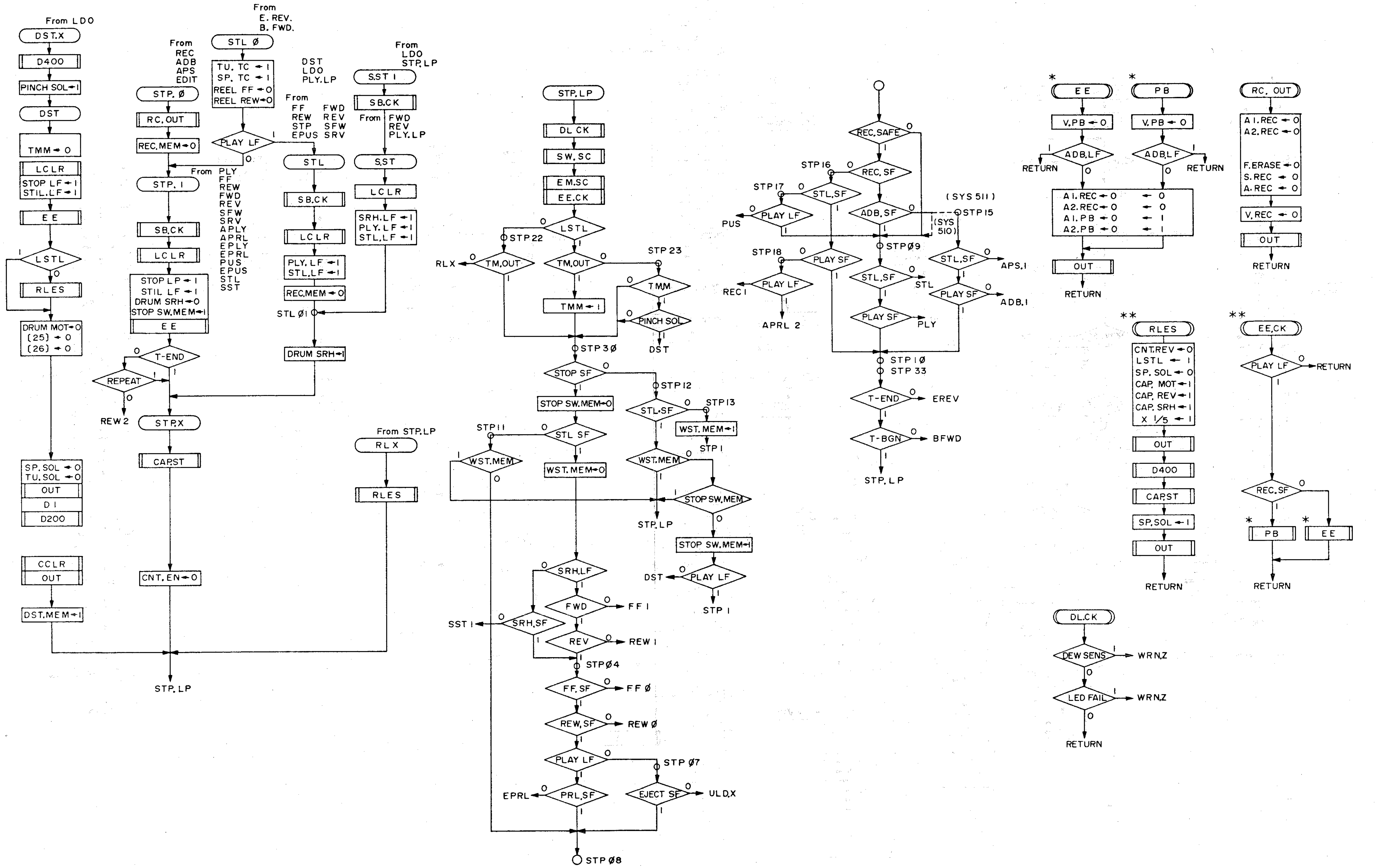
(1) IC3 (UPD553C-235)

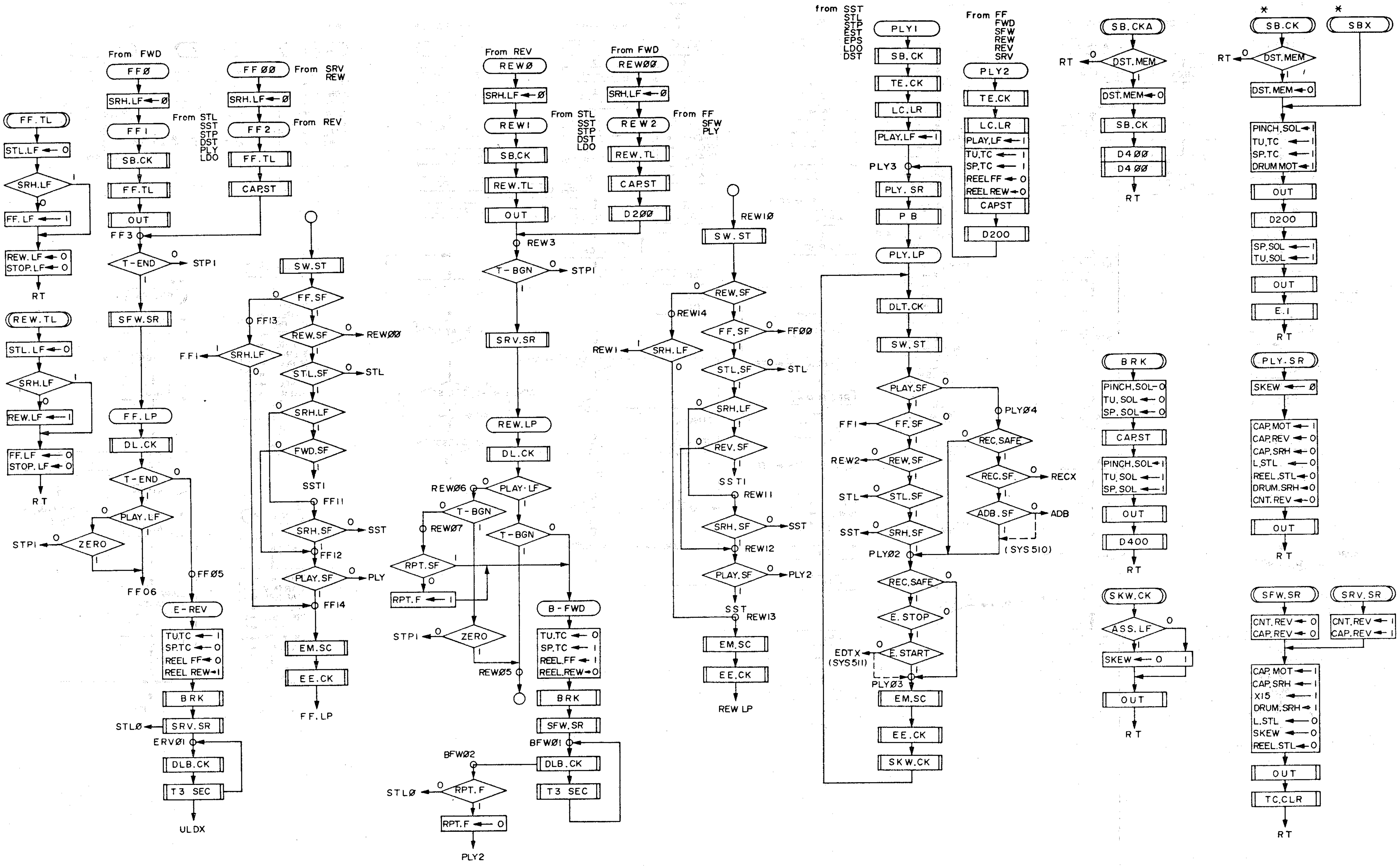

START
INIT
PE3
PI2
PC←0
PD←0
RAM.CL
RAM CLEAR & PRESET
WRN.CK
WRN.M
WRN.L Ø
CS.CK
SW.SC
DEW
1(Y)
CSC Ø1
WRN.L 2
LED FAIL
(Y)
CSC Ø2
WRN.L 1
C.C.SW
CAS.SW
CSC Ø5
ULD END
DRW.X
DRAW END
DRW.X
ULD.Z
CSC Ø3
ULD END
ULD.Z
LCLR
EM.SC
OUT
CSC Ø4
EJECT SW
ULD.X
WRN.X
PIo←1
WRN.Z
CCLR
OUT
RC.OUT
D400
PIo←Ø
from EJC
CS.CK.Z
CSC.MEM←0
from STR LP
DRAW. I
CCLR
OUT
D400
from CSC K
DRAW.X
LD.LFS
DRAW END
DRW Ø1
AGAIN
HF.LD.X
STR.X
D400
REEL DRAW←1
ARM.DRAW←1
SP.SOL←1
TU.SOL←1
OUT
TC.CLR
DRW.LP
DRAW END
HF.LD.X
SW.SC
LD.SC
T6 SEC
STR.X
from AFF.LP ARW.LP ULD.LP DRW.LP
STR.X
LCLR
CCLR
OUT
D400
EJECT.LF←1
FLK←1
SW SC
STORE END
EJC
REEL.STR←1
OUT
D400
TU.SOL←1
SP.SOL←1
ARM STORE←1
OUT
TC.CLR
STR.LP
SW.SC
STORE END
EJC
T6 SEC
CAS.SW
EJC.
AGAIN
WRN.X
AGAIN←1
DRAW I
from STR.LP
EJC.
CCLR
OUT
D200
CCLR
CSC.MEM
EJC.Ø3
SP.SOL←1
TU.SOL←1
CC.MOT←1
OUT
TC.CLR
EJC.LP
CC.SW
EJC.Ø2
T6 SEC
WRN.X
D200
TC.CLR
EJC.Ø1
CC.SW
T6 SEC
WRN.X
EJC.Ø3
LCLR
CCLR
OUT
CS.CK
from DRW.LP
HF.LD.X
ARM DRAW←0
OUT
HF LD I
CCLR
OUT
D200
ULD.SW
LD 4
T-BGN
A.FF
FF.SR
TC.CLR
A.FF.LP
HF.TC
LD.SC
T3 SEC
CCLR
OUT
D200

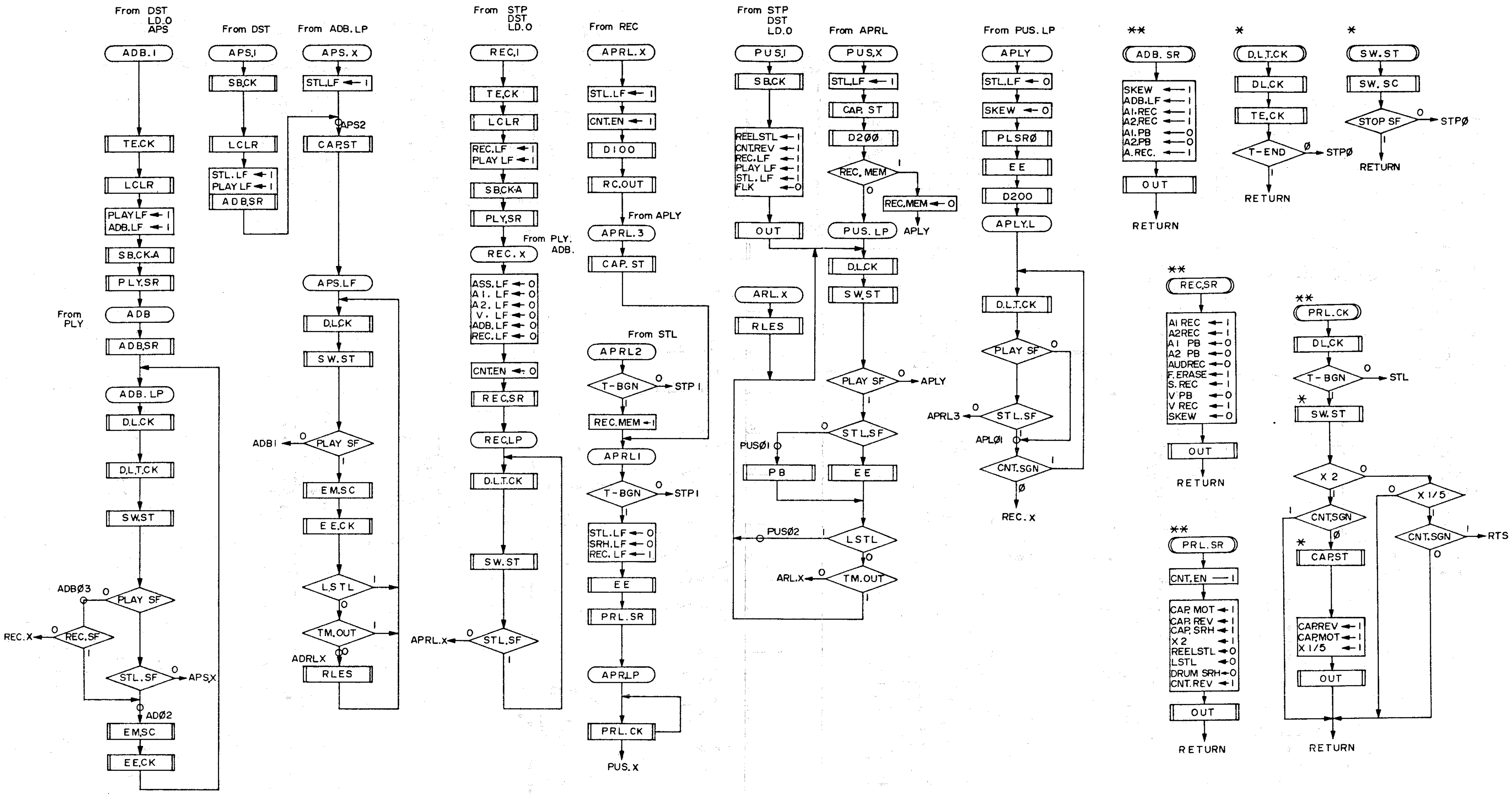

START
INIT
PE3
PI2
PC ← 0
PD ← 0
WRN.X
PIo ← 1
WRN.Z
CCLR
OUT
RC. OUT
D400
PIo ← 0
RAM.CL
RAM CLEAR & PRESET
WRN. CK
WRN.M
WRN.L 0
from EJC
CS.CK.Z
CSC.MEM ← 0
CS.CK
SW. SC
DEW
1(Y)
WRN.L 2
CSC 01
LED FAIL
(Y)
WRN.L 1
CSC 02
C.C. SW
CSC 05
CAS. SW
DRW. X
ULD END
CSC 03
ULD END
ULD.Z
DRW. X
DRAW END
ULD.Z
LCLR
EM.SC
OUT
CSC 04
EJECT SW
ULD. X
from STR LP
DRAW. 1
CCLR
OUT
D400
from CSC K
DRAW. X
LD.LFS
DRAW END
DRW 01
AGAIN
HF.LD.X
STR.X
D400
REEL DRAW ← 1
ARM.DRAW ← 1
SP. SOL ← 1
TU. SOL ← 1
OUT
TC.CLR
DRW. LP
DRAW END
HF.LD.X
SW. SC
LD. SC
T6 SEC
STR.X
from AFF.LP ARW.LP ULD.LP DRW.LP
STR.X
LCLR
CCLR
OUT
D400
EJECT. LF ← 1
FLK ← 1
SW SC
STORE END
EJC
REEL.STR ← 1
OUT
D400
TU. SOL ← 1
SP. SOL ← 1
ARM STORE ← 1
OUT
TC.CLR
STR.LP
SW. SC
STORE END
EJC
T6 SEC
CAS. SW
EJC.
AGAIN
WRN.X
AGAIN ← 1
DRAW 1
from STR.LP
EJC.
CCLR
OUT
D200
CCLR
CSC.MEM
EJC.03
SP. SOL ← 1
TU.SOL ← 1
CC.MOT ← 1
OUT
TC.CLR
EJC. LP
CC. SW
EJC. 02
T6 SEC
WRN.X
D200
TC.CLR
EJC. 01
CC. SW
T6 SEC
WRN.X
EJC. 03
LCLR
CCLR
OUT
CS.CK
from DRW. LP
HF. LD.X
ARM DRAW ← 0
OUT
HF LD 1
CCLR
OUT
D200
ULD. SW
LD 4
T-BGN
T-END
LD 4
A.FF
A.REW
FF. SR
RW.SR
TC.CLR
TC.CLR
A.FF.LP
ARW.LP
HF. TC
HF. TC
LD. SC
LD. SC
T3 SEC
T3 SEC
CCLR
STR.X
OUT
D200
HF. TC
T-BGN
RETURN
T-END
RETURN
* FF. SR
* REW. SR
REEL. FF ← 1
REEL.REW ← 1
CNT.REV ← 0
CNT.REV ← 1
DRUM MOT ← 1
SP. SOL ← 1
TU. SOL ← 1
OUT
RETURN
* WRN.L 0
FLK ← 1
* WRN.L X
WRN.L ← 1
OUT
RETURN
* WRN.L 1
* WRN.L 2
T1 SEC
T3 SEC
RETURN
RETURN
FLK ← 1/0
WRN.L F ← 1
OUT
RETURN
SW. SC
DP ← 06
SW.SCS
DPL ← DPL − 1
Acc ← DPL
Acc = 0
RETURN
Acc ← PE
SW.SS0
PA0
(DP)0 ← 1
SW.S00
(DP)0
(DP)0 ← 0
SW.SS1
PA1
(DP)1 ← 1
SW.S01
(DP)1
(DP)1 ← 0
SW.SS2
PA2
(DP)2 ← 1
SW.S02
(DP)2
(DP)2 ← 0
SW.SS3
PA3
(DP)3 ← 1
SW.S03
(DP)3
(DP)3 ← 0
SW.S04
STM. 10msec
TTM

3-18

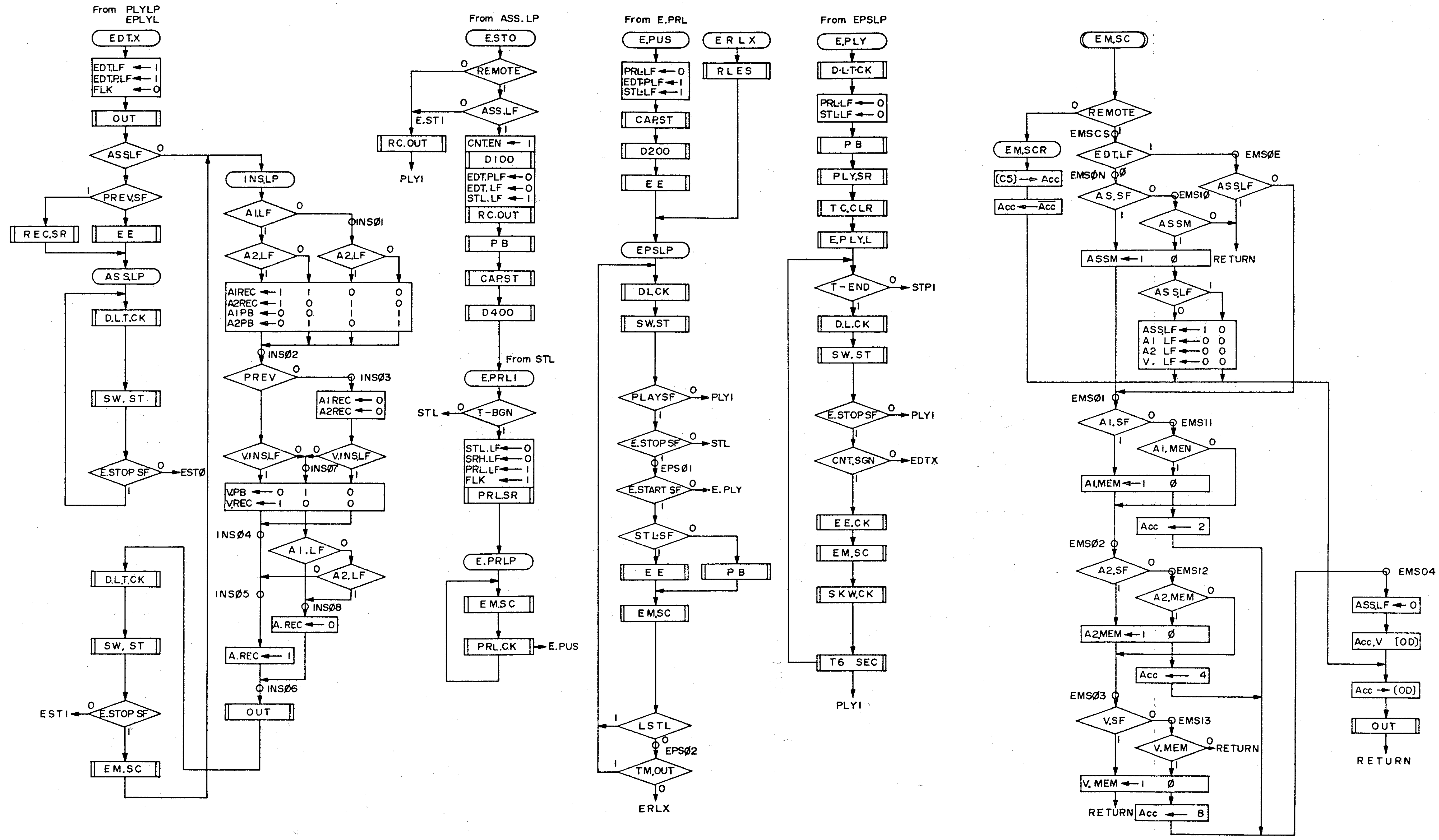

From ULD
LD.I
RING ULD.←0
LD.3
D400
LD.4
CSC.MEM←0
From HF.LDX
CNT.REV ←I
TU.SOL ←I
RING LD. ←I
TU.TC ←I
DRUM MOT.←I
OUT
TC.CLR
DST.MEM←I
LD.LP
SW.SC
LE.ZONE
SP.SOL
SP.SOL ←I
SP.TC ←I
OUT
LD.END
LD.0
EJECT.SF
ULD.X
EM.SC
LD.SC
T6 SEC
ULDX
LD.SC
LD.SCS
SW.SC
EJECT SF
ULD.XX
STOP SF
LDS.Ø1
RETURN
REC/ADB.LF
DST.MEM←I
LCLR
FF.SF
LDS.Ø2
LCLR
FF.LF ←I
REW.SF
LDS.Ø3
LCLR
REW.LF←I
PLAY SF
LDS.Ø4
LCLR
LDS.Ø5
STL.SF
LCLR
STL.LF←I
LDS.Ø6
REC.SAFE
REC.SF
LDS.Ø7
REC.LF←I
(SYS 510)
ADUB.SF
LDS.Ø8
(SYS511)
ADUB.LF←I
LDS.IØ
SRH.SF
LDS.Ø9
LCLR
PLAY LF←I
SRH.LF←I
STL.LF←I
LDS.II
STOP LF←I
FLK. ←I
OUT
RETURN
RETURN.
From CSCK
ULDZ
CSC.MEM←I
TC.CLR
ULD.Ø1
PINCH.SW
T3 SEC
WRN.X
*
CAP.STP
CNT.REV
CAP.REV←I ←0
FG.STOP
XI5 ←I
X 2 ←0
XI/5 ←0
OUT
TC.CLR
CAP.Ø3
FG.STOP
(Z)←ØAH ØCH
TI SEC
CAP.Ø4
CAP.MOT←0
CAP.SRH←I
SKEW ←0
XI5 ←0
X 2 ←0
XI/5 ←0
REELSTL←I
OUT
Z → Acc
D400
RETURN
ULD.X
ULD.SW
STR.X
ULD.XX
RPT.F← Ø
DI
LCLR
CCLR
EJECT.LF←I
CNT.REV←0
TU.TC ←I
TU.SOL ←I
DEWSENS
DRUM MOT←I 0
OUT
ULD.Ø2
D200
RING ULD←I
OUT
TC.CLR
ULD.LP
SW.SC
UNLD.END
STR.X
EJECT SF
(OI) = ØFH
STL.SF
SRH.SF
ULK
EM.SC
LD.SCS
T6 SEC
LDI
WRN.X
From LD.LP
LD.0
RING.LD.←0
OUT
LDO.Ø1
D2ØØ
T-END
LDO.Ø5
T-BGN
ULD.X
T-BGN
AFW
ARV
FF.LF
FFI
REW.LF
REWI
LDO.Ø2
SRH.LF
SSTI
LDO.Ø7
REC.LF
STL.LF
REC.I
LDO.Ø3
PUSI
ADB.LF
STL.LF
ADBI
LDO.Ø4
APSI
STL.LF
LDO.Ø6
PLAY.LF
STL
PLAY LF
PLYI
STPI
DST.X
From AFW.LP
ARV.LP
LD.0X
CAP.STP.
From LDO
A.REV
S.B.X
S.REV.SR
From LDO
A.FWD
S.B.X
S.FWD.SR
AREV.LP
D.L.B.CK
LDO.X
LD.SC
T6 SEC
ULD.X
LD.L.F.S.
LCLR
STOP LF←I
STL.LF ←I
FLK ←I
OUT
RETURN
D400
TTM
STM 3FH
Acc + I
Ø
RETURN
DL.B.CK
SW.SC
EJECT.SF
ULDX
DLCK
T-BGN
RTS
T-END
RTS
RETURN


From LDO
DST.X
D400
PINCH SOL←1
DST
TMM←0
LCLR
STOP LF←1
STIL.LF←1
EE
LSTL
RLES
DRUM MOT←0
(25)←0
(26)←0
SP.SOL←0
TU.SOL←0
OUT
D1
D200
CCLR
OUT
DST.MEM←1
From REC ADB APS EDIT
STP.0
RC.OUT
REC.MEM←0
From PLY FF REW FWD REV SFW SRV APLY APRL EPLY EPRL PUS EPUS STL SST
STP.1
SB.CK
LCLR
STOP LP←1
STIL LF←1
DRUM SRH←0
STOP SW.MEM←1
EE
T-END
REPEAT
REW 2
STP.X
CAPST
CNT.EN←0
STP.LP
From E.REV. B.FWD.
STL 0
TU.TC←1
SP.TC←1
REEL FF←0
REEL REW←0
PLAY LF
DST LDO PLY.LP
From FF REW STP EPUS FWD REV SFW SRV
STL
SB.CK
LCLR
PLY.LF←1
STL.LF←1
REC.MEM←0
STL 01
DRUM SRH←1
From LDO STP.LP
S.ST 1
SB.CK
From FWD REV PLY.LP
S.ST
LCLR
SRH.LF←1
PLY.LF←1
STL.LF←1
From STP.LP
RLX
RLES
STP.LP
DL CK
SW.SC
EM.SC
EE.CK
LSTL
STP22
RLX
TM.OUT
TM.OUT
STP 23
TMM
TMM←1
PINCH SOL
DST
STP30
STOP SF
STOP SW.MEM←0
STP12
STL.SF
STP13
WST.MEM←1
STP 1
STP11
STL SF
WST.MEM
WST.MEM←0
WST.MEM
STOP SW.MEM
STP.LP
STOP SW.MEM←1
DST
PLAY LF
STP 1
SRH.LF
FWD
FF 1
SST 1
SRH.SF
REV
REW 1
STP04
FF.SF
FF 0
REW.SF
REW 0
PLAY LF
STP 07
EPRL
PRL.SF
EJECT SF
ULD.X
STP 08
REC.SAFE
STP 16
REC.SF
STP 17
STL.SF
PUS
PLAY LF
ADB.SF
(SYS 511)
STP15
(SYS 510)
STP09
STL.SF
APS.1
STP18
PLAY SF
REC 1
PLAY LF
STL.SF
STL
PLAY SF
ADB.1
APRL 2
PLAY SF
PLY
STP 10
STP 33
T-END
EREV
T-BGN
BFWD
STP.LP
*
EE
V.PB←0
ADB.LF
RETURN
A1.REC←0 ←0
A2.REC←0 ←0
A1.PB←0 ←1
A2.PB←0 ←1
OUT
RETURN
*
PB
V.PB←0
ADB.LF
RETURN
RC.OUT
A1.REC←0
A2.REC←0
F.ERASE←0
S.REC←0
A.REC←0
V.REC←0
OUT
RETURN
**
RLES
CNT.REV←0
LSTL←1
SP.SOL←0
CAP.MOT←1
CAP.REV←1
CAP.SRH←1
X 1/5←1
OUT
D400
CAPST
SP.SOL←1
OUT
RETURN
**
EE.CK
PLAY LF
RETURN
REC.SF
*
PB
*
EE
RETURN
DL.CK
DEW SENS
WRN.Z
LED FAIL
WRN.Z
RETURN


FF.TL
STL.LF ← 0
SRH.LF
FF.LF ← 1
REW.LF ← 0
STOP.LF ← 0
RT
REW.TL
STL.LF ← 0
SRH.LF
REW.LF ← 1
FF.LF ← 0
STOP.LF ← 0
RT
From FWD
FF0
SRH.LF ← 0
FF1
From STL SST STP DST PLY LDO
SB.CK
FF.TL
OUT
FF3
T-END
STP1
SFW.SR
FF.LP
DL.CK
T-END
PLAY.LF
ZERO
STP1
FF06
FF05
E-REV
TU.TC ← 1
SP.TC ← 0
REEL FF ← 0
REEL REW ← 1
BRK
SRV.SR
STL0
ERV01
DLB.CK
T3 SEC
ULDX
FF00
From SRV REW
SRH.LF ← 0
FF2
From REV
FF.TL
CAP.ST
SW.ST
FF.SF
FF13
REW.SF
REW00
FF1
SRH.LF
STL.SF
STL
SRH.LF
FWD.SF
SST1
FF11
SRH.SF
SST
FF12
PLAY.SF
PLY
FF14
EM.SC
EE.CK
FF.LP
From REV
REW0
SRH.LF ← 0
REW1
From STL SST STP DST LDO
SB.CK
REW.TL
OUT
REW3
T-BGN
STP1
SRV.SR
REW.LP
DL.CK
PLAY-LF
REW06
T-BGN
REW07
T-BGN
RPT.SF
RPT.F ← 1
ZERO
STP1
REW05
B-FWD
TU.TC ← 0
SP.TC ← 1
REEL.FF ← 1
REEL.REW ← 0
BRK
SFW.SR
BFW01
BFW02
DLB.CK
RPT.F
STL0
T3 SEC
RPT.F ← 0
PLY2
From FWD
REW00
SRH.LF ← 0
REW2
From FF SFW PLY
REW.TL
CAP.ST
D200
REW10
SW.ST
REW.SF
REW14
FF.SF
FF00
REW1
SRH.LF
STL.SF
STL
SRH.LF
REV.SF
SST1
REW11
SRH.SF
SST
REW12
PLAY.SF
PLY2
SST
REW13
EM.SC
EE.CK
REW LP
from SST STL STP EST EPS LDO DST
PLY1
SB.CK
TE.CK
LC.LR
PLAY.LF ← 1
PLY3
PLY.SR
PB
PLY.LP
DLT.CK
SW.ST
PLAY.SF
FF1
FF.SF
REW2
REW.SF
STL
STL.SF
SST
SRH.SF
PLY02
REC.SAFE
E.STOP
EDTX (SYS511)
E.START
PLY03
EM.SC
EE.CK
SKW.CK
From FF FWD SFW REW REV SRV
PLY2
TE.CK
LC.LR
PLAY.LF ← 1
TU.TC ← 1
SP.TC ← 1
REEL FF ← 0
REEL REW ← 0
CAPST
D200
PLY04
REC.SAFE
REC.SF
RECX
ADB.SF
ADB
(SYS 510)
SB.CKA
RT
DST.MEM
DST.MEM ← 0
SB.CK
D400
D400
RT
BRK
PINCH.SOL ← 0
TU.SOL ← 0
SP.SOL ← 0
CAP.ST
PINCH.SOL ← 1
TU.SOL ← 1
SP.SOL ← 1
OUT
D400
RT
SKW.CK
ASS.LF
SKEW ← 0
OUT
RT
*
SB.CK
*
SBX
RT
DST.MEM
DST.MEM ← 0
PINCH.SOL ← 1
TU.TC ← 1
SP.TC ← 1
DRUM MOT ← 1
OUT
D200
SP.SOL ← 1
TU.SOL ← 1
OUT
E.1
RT
PLY.SR
SKEW ← 0
CAP.MOT ← 1
CAP.REV ← 0
CAP.SRH ← 0
L.STL ← 0
REEL.STL ← 0
DRUM.SRH ← 0
CNT.REV ← 0
OUT
RT
SFW.SR
CNT.REV ← 0
CAP.REV ← 0
SRV.SR
CNT.REV ← 1
CAP.REV ← 1
CAP.MOT ← 1
CAP.SRH ← 1
X15 ← 1
DRUM.SRH ← 1
L.STL ← 0
SKEW ← 0
REEL.STL ← 0
OUT
TC.CLR
RT

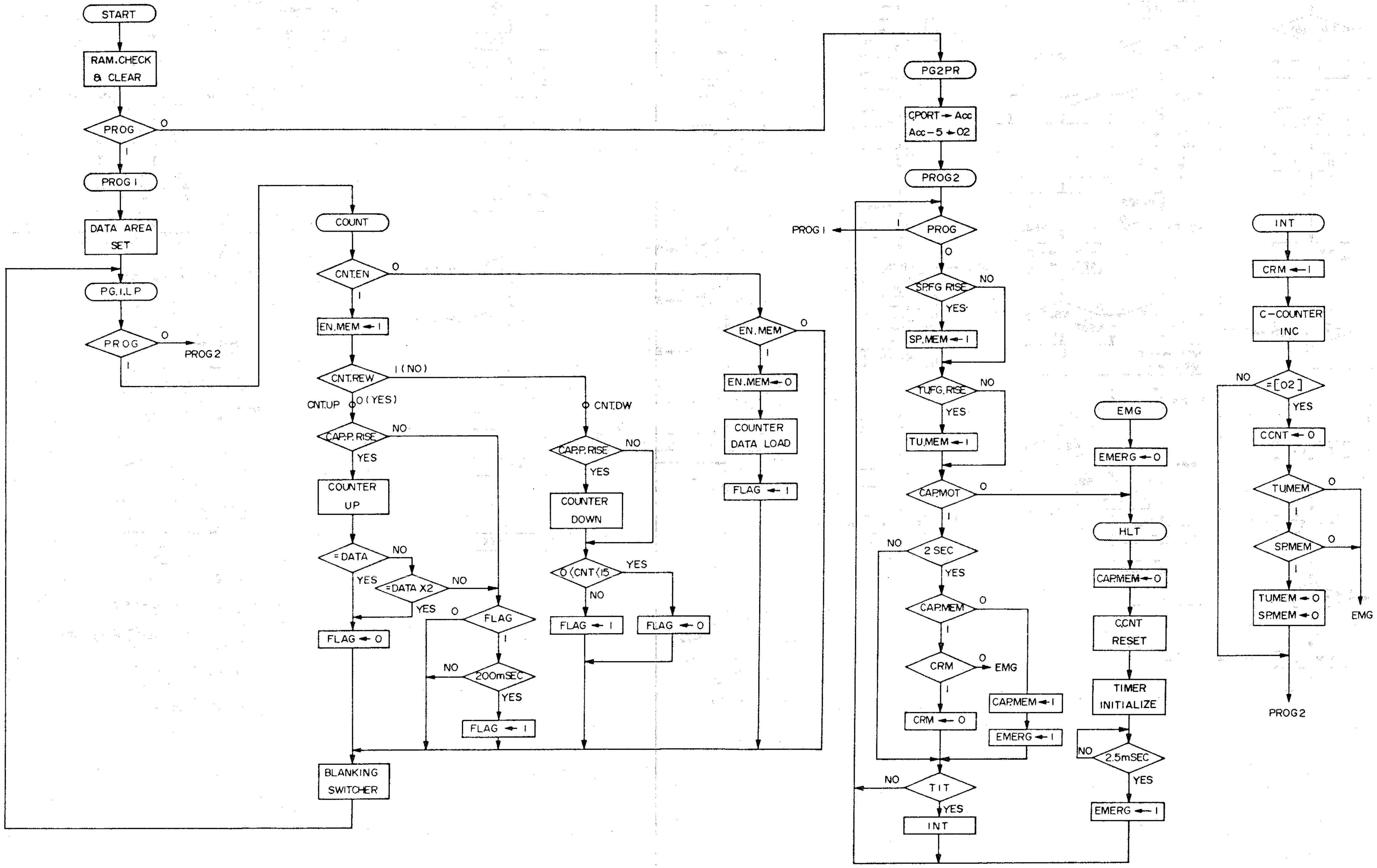

From DST LD.O APS
ADB.I
TE.CK
LCLR
PLAY LF ← 1
ADB.LF ← 1
SB.CK.A
PLY.SR
From PLY
ADB
ADB.SR
ADB.LP
D.L.CK
D.L.T.CK
SW.ST
ADBØ3
PLAY SF
REC.X
REC.SF
STL.SF
APS.X
ADØ2
EM.SC
EE.CK
From DST
APS.I
SB.CK
LCLR
STL.LF ← 1
PLAY LF ← 1
ADB.SR
From ADB.LP
APS.X
STL.LF ← 1
APS2
CAP.ST
APS.LF
D.L.CK
SW.ST
ADB I
PLAY SF
EM.SC
EE.CK
LSTL
TM.OUT
ADRL.X
RLES
From STP DST LD.O
REC.I
TE.CK
LCLR
REC.LF ← 1
PLAY LF ← 1
SB.CK.A
PLY.SR
From PLY. ADB.
REC.X
ASS.LF ← 0
A1. LF ← 0
A2. LF ← 0
V. LF ← 0
ADB.LF ← 0
REC.LF ← 0
CNT.EN ← 0
REC.SR
REC.LP
D.L.T.CK
SW.ST
APRL.X
STL.SF
From REC
APRL.X
STL.LF ← 1
CNT.EN ← 1
D100
RC.OUT
From APLY
APRL.3
CAP. ST
From STL
APRL2
T-BGN
STP 1
REC.MEM ← 1
APRL1
T-BGN
STP1
STL.LF ← 0
SRH.LF ← 0
REC. LF ← 1
EE
PRL.SR
APRL.P
PRL.CK
PUS.X
From STP DST LD.O
PUS.I
SB.CK
REELSTL ← 1
CNT.REV ← 1
REC.LF ← 1
PLAY LF ← 1
STL. LF ← 1
FLK ← 0
OUT
ARL.X
RLES
PUSØ1
PB
PUSØ2
ARL.X
From APRL
PUS.X
STL.LF ← 1
CAP. ST
D2ØØ
REC. MEM
REC.MEM ← 0
APLY
PUS. LP
D.L.CK
SW.ST
PLAY SF
APLY
STL.SF
EE
LSTL
TM.OUT
From PUS. LP
APLY
STL.LF ← 0
SKEW ← 0
PLSRØ
EE
D200
APLY.L
D.L.T.CK
PLAY SF
APRL3
STL.SF
APLØ1
CNT.SGN
REC. X
**
ADB. SR
SKEW ← 1
ADB.LF ← 1
A1.REC ← 1
A2.REC ← 1
A1.PB ← 0
A2.PB ← 0
A.REC. ← 1
OUT
RETURN
*
D.L.T.CK
D.L.CK
TE.CK
T-END
STPØ
RETURN
*
SW.ST
SW. SC
STOP SF
STPØ
RETURN
**
REC.SR
A1 REC ← 1
A2REC ← 1
A1 PB ← 0
A2 PB ← 0
AUDREC ← 0
F.ERASE ← 1
S. REC ← 1
V PB ← 0
V REC ← 1
SKEW ← 0
OUT
RETURN
**
PRL.SR
CNT.EN ← 1
CAP. MOT ← 1
CAP. REV ← 1
CAP. SRH ← 1
X 2 ← 1
REELSTL ← 0
LSTL ← 0
DRUM SRH ← 0
CNT.REV ← 1
OUT
RETURN
**
PRL.CK
DL.CK
T-BGN
STL
*
SW.ST
X 2
X 1/5
CNT.SGN
CNT.SGN
RTS
*
CAP.ST
CAP.REV ← 1
CAP.MOT ← 1
X 1/5 ← 1
OUT
RETURN
0
1
Ø

3-22

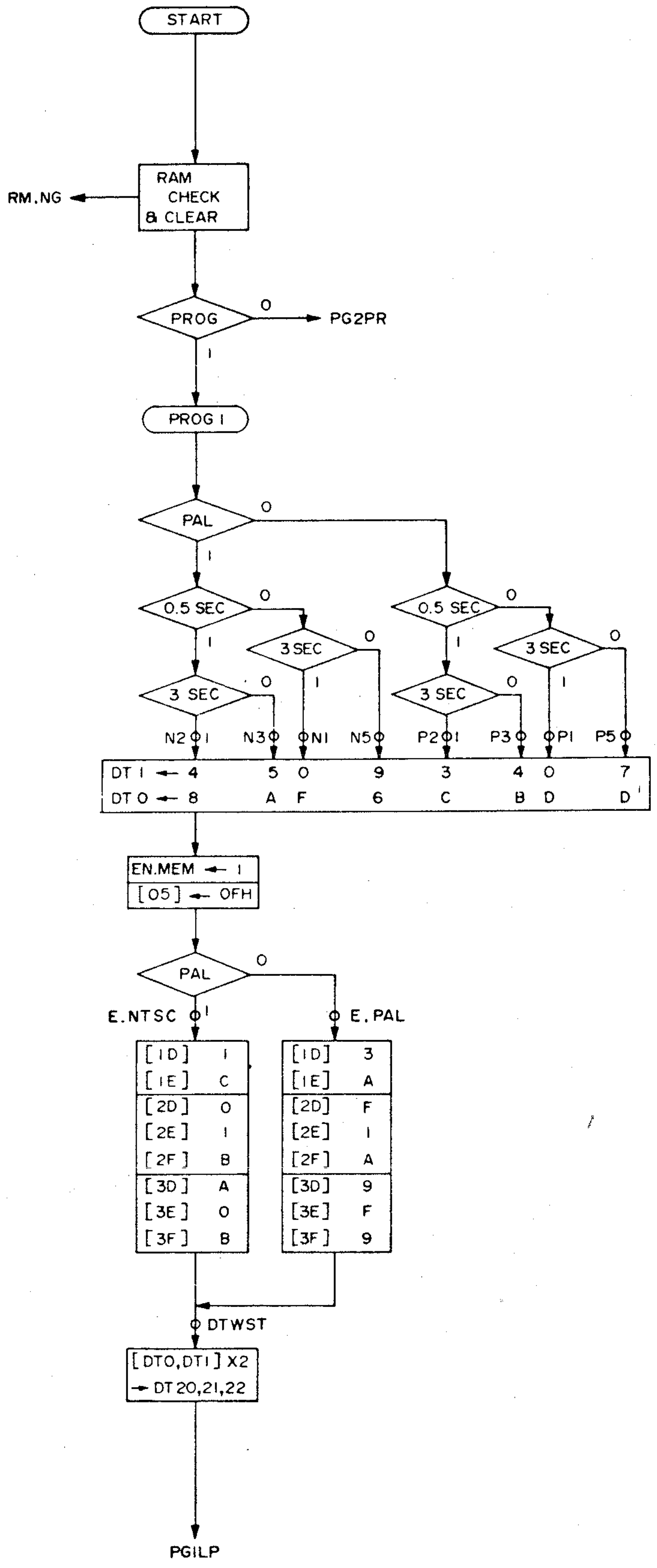

From PLYLP EPLYL
EDT.X
EDT.LF ← 1
EDT.P.LF ← 1
FLK ← 0
OUT
ASS.LF
PREV.SF
REC.SR
EE
AS S.LP
D.L.T.CK
SW. ST
E.STOP SF
EST0
D.L.T.CK
SW. ST
E.STOP SF
EST1
EM.SC
INS.LP
A1.LF
INS01
A2.LF
A2.LF
A1REC ← 1 1 0 0
A2REC ← 1 0 1 0
A1PB ← 0 0 1 1
A2PB ← 0 1 0 1
INS02
PREV
INS03
A1 REC ← 0
A2REC ← 0
V.INS.LF
V.INS.LF
INS07
V.PB ← 0 1 0
V.REC ← 1 0 0
INS04
A1.LF
A2.LF
INS05
INS08
A. REC ← 0
A.REC ← 1
INS06
OUT
From ASS. LP
E.STO
REMOTE
ASS.LF
E.ST1
RC.OUT
PLY1
CNT.EN ← 1
D100
EDT.P.LF ← 0
EDT. LF ← 0
STL. LF ← 1
RC.OUT
P B
CAP.ST
D400
From STL
E.PRL1
STL
T-BGN
STL.LF ← 0
SRH.LF ← 0
PRL.LF ← 1
FLK ← 1
PRL.SR
E.PRLP
EM.SC
PRL.CK
E.PUS
From E.PRL
E.PUS
PRL.LF ← 0
EDT.P.LF ← 1
STL.LF ← 1
CAP.ST
D200
E E
ERLX
RLES
EPSLP
DLCK
SW.ST
PLAYSF
PLY1
E.STOP SF
STL
EPS01
E.START SF
E. PLY
STL.SF
E E
P B
EM.SC
LSTL
EPS02
TM.OUT
ERLX
From EPSLP
E.PLY
D.L.T.CK
PRL.LF ← 0
STL.LF ← 0
P B
PLY.SR
T C.CLR
E.P LY.L
T-END
STP1
D.L.CK
SW. ST
E.STOP SF
PLY1
CNT.SGN
EDTX
EE.CK
EM.SC
S K W.CK
T6 SEC
PLY1
EM.SC
REMOTE
EMSCS
EM.SCR
(C5) → Acc
Acc ← Acc
EDT.LF
EMS0E
EMS0N
AS.SF
EMS10
ASS.LF
ASSM
ASSM ← 1 0
RETURN
AS S.LF
ASS.LF ← 1 0
A1 LF ← 0 0
A2 LF ← 0 0
V. LF ← 0 0
EMS01
A1.SF
EMS11
A1. MEN
A1.MEM ← 1 0
Acc ← 2
EMS02
A2.SF
EMS12
A2.MEM
A2.MEM ← 1 0
Acc ← 4
EMS03
V.SF
EMS13
V. MEM
RETURN
V. MEM ← 1 0
RETURN
Acc ← 8
EMS04
ASS.LF ← 0
Acc.V (0D)
Acc → (0D)
OUT
RETURN

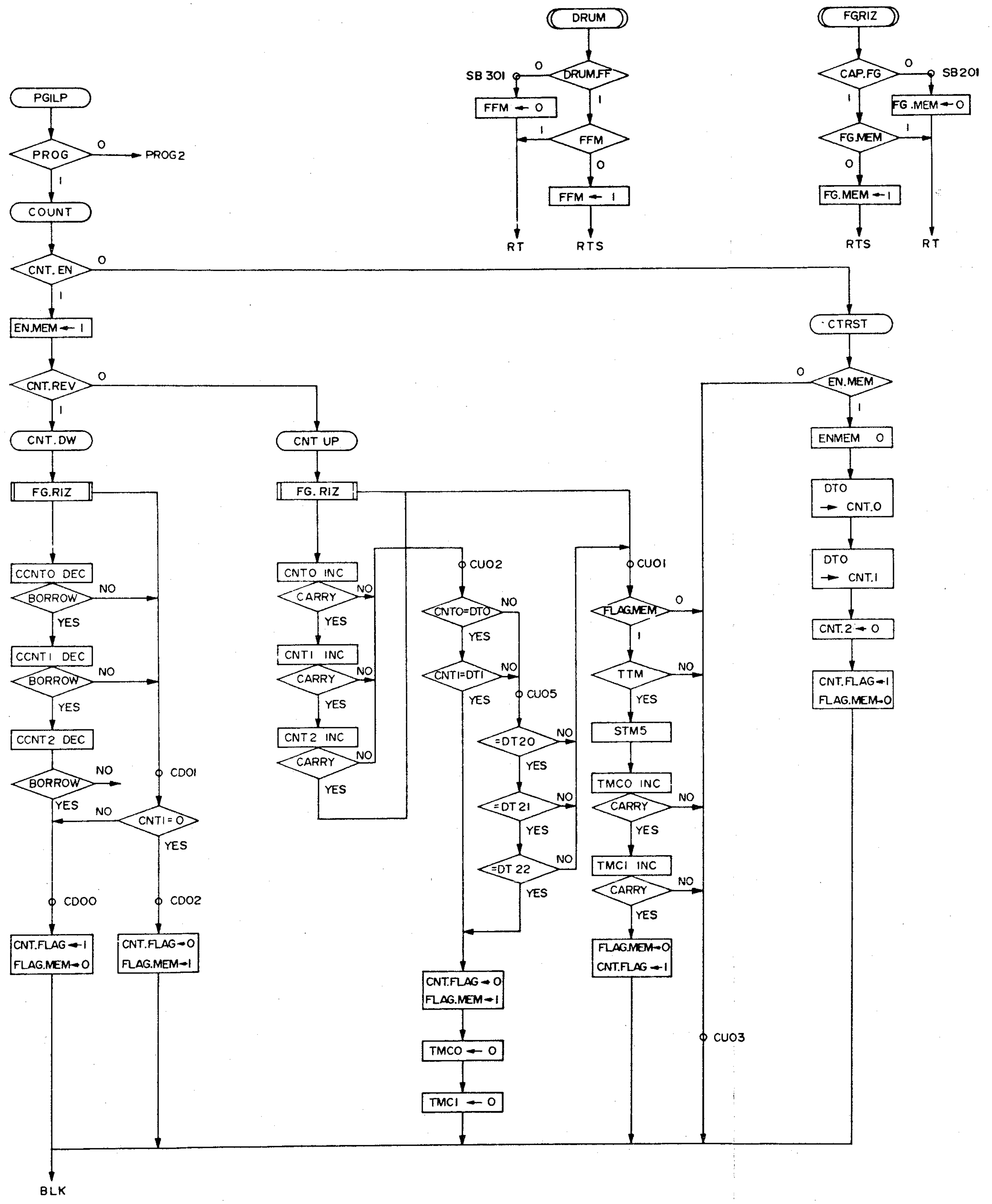
(2) IC7 (LM6416E-131)

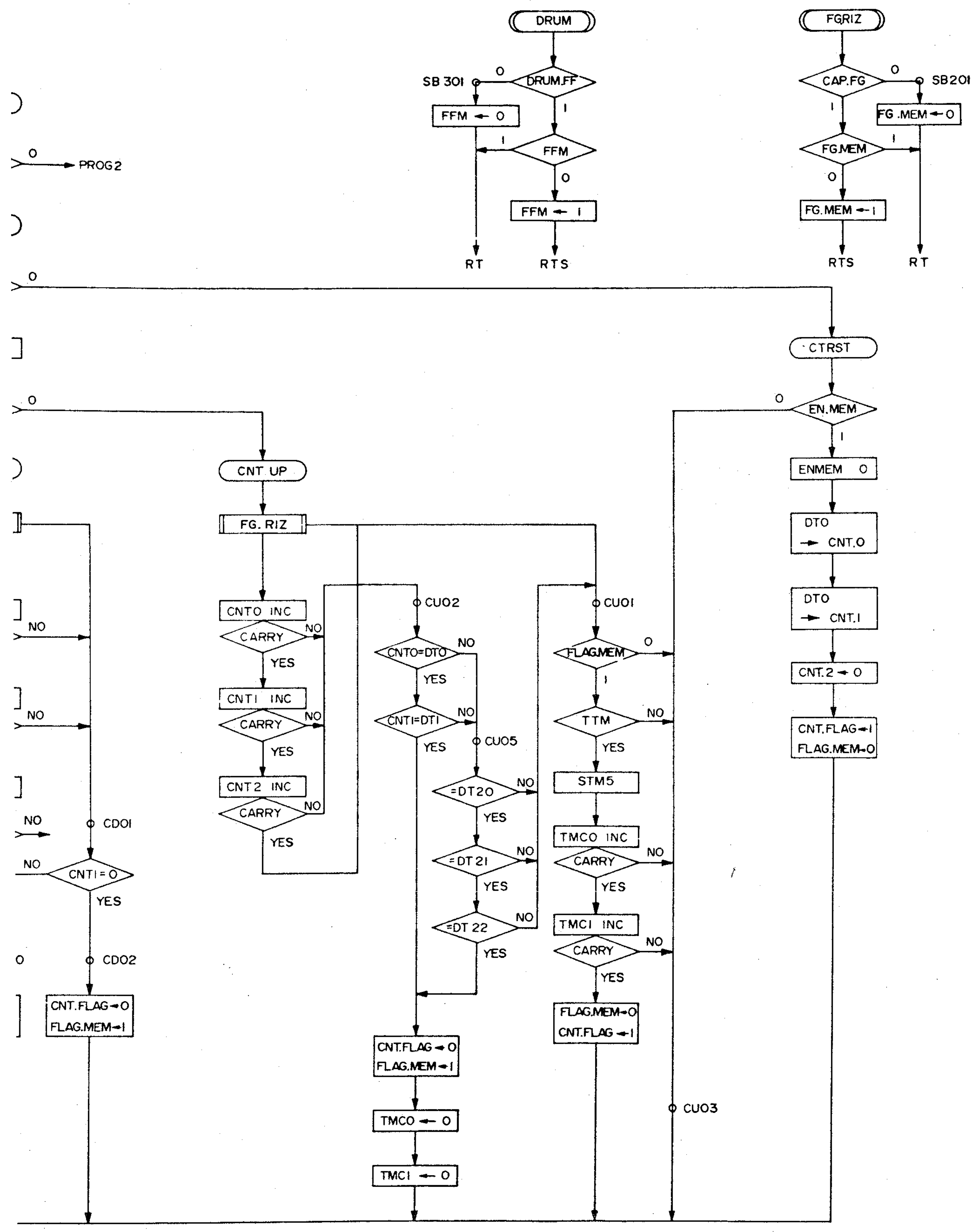
1/3 RS510



START
RAM.CHECK & CLEAR
PROG
0
1
PROG 1
DATA AREA SET
PG.I.L.P
PROG
0
PROG2
1
COUNT
CNT.EN
0
1
EN.MEM ← 1
CNT.REW
1 (NO)
CNT.UP
0 (YES)
CNT.DW
CAP.P. RISE
NO
YES
COUNTER UP
= DATA
NO
YES
= DATA X2
NO
YES
FLAG ← 0
FLAG
0
1
200mSEC
NO
YES
FLAG ← 1
CAP.P. RISE
NO
YES
COUNTER DOWN
0 ⟨CNT⟨15
YES
NO
FLAG ← 1
FLAG ← 0
EN.MEM
0
1
EN.MEM ← 0
COUNTER DATA LOAD
FLAG ← 1
BLANKING SWITCHER
PG2PR
C.PORT → Acc
Acc − 5 → 02
PROG2
PROG
PROG 1
1
0
SP.FG RISE
NO
YES
SP.MEM ← 1
TU.FG. RISE
NO
YES
TU.MEM ← 1
CAP.MOT
0
1
2 SEC
NO
YES
CAP.MEM
0
1
CRM
0
EMG
1
CRM ← 0
CAP.MEM ← 1
EMERG ← 1
T1T
NO
YES
INT
EMG
EMERG ← 0
HLT
CAP.MEM ← 0
C.CNT RESET
TIMER INITIALIZE
2.5mSEC
NO
YES
EMERG ← 1
INT
CRM ← 1
C−COUNTER INC
= [02]
NO
YES
CCNT ← 0
TUMEM
0
1
SP.MEM
0
1
TUMEM ← 0
SP.MEM ← 0
EMG
PROG2


START
RAM CHECK & CLEAR
RM.NG
PROG
0
PG2PR
1
PROG I
PAL
0
1
0.5 SEC
3 SEC
N2
N3
N1
N5
P2
P3
P1
P5
DT I ← 4 5 0 9 3 4 0 7
DT 0 ← 8 A F 6 C B D D
EN.MEM ← 1
[05] ← 0FH
PAL
E.NTSC
E.PAL
[1D] 1
[1E] C
[2D] 0
[2E] 1
[2F] B
[3D] A
[3E] 0
[3F] B
[1D] 3
[1E] A
[2D] F
[2E] 1
[2F] A
[3D] 9
[3E] F
[3F] 9
DTWST
[DT0,DT1] X2 → DT20,21,22
PGILP


DRUM
DRUM.FF
SB 301
0
1
FFM ← 0
FFM
FFM ← 1
RT
RTS
FGRIZ
CAP.FG
SB201
FG.MEM ← 0
FG.MEM
FG.MEM ← 1
RTS
RT
PGILP
PROG
PROG2
COUNT
CNT. EN
EN.MEM ← 1
CNT.REV
CNT.DW
CNT UP
FG.RIZ
CCNT0 DEC
BORROW
NO
YES
CCNT1 DEC
CCNT2 DEC
CD01
CNT1=0
CD00
CD02
CNT.FLAG ← 1
FLAG.MEM ← 0
CNT.FLAG ← 0
FLAG.MEM ← 1
CNT0 INC
CARRY
CNT1 INC
CNT 2 INC
CU02
CNT0=DT0
CNT1=DT1
CU05
=DT20
=DT21
=DT 22
CNT.FLAG ← 0
FLAG.MEM ← 1
TMC0 ← 0
TMC1 ← 0
CU01
FLAG.MEM
TTM
STM5
TMC0 INC
TMC1 INC
FLAG.MEM ← 0
CNT.FLAG ← 1
CU03
CTRST
EN.MEM
ENMEM 0
DT0 → CNT.0
DT0 → CNT.1
CNT.2 → 0
CNT.FLAG ← 1
FLAG.MEM ← 0
BLK

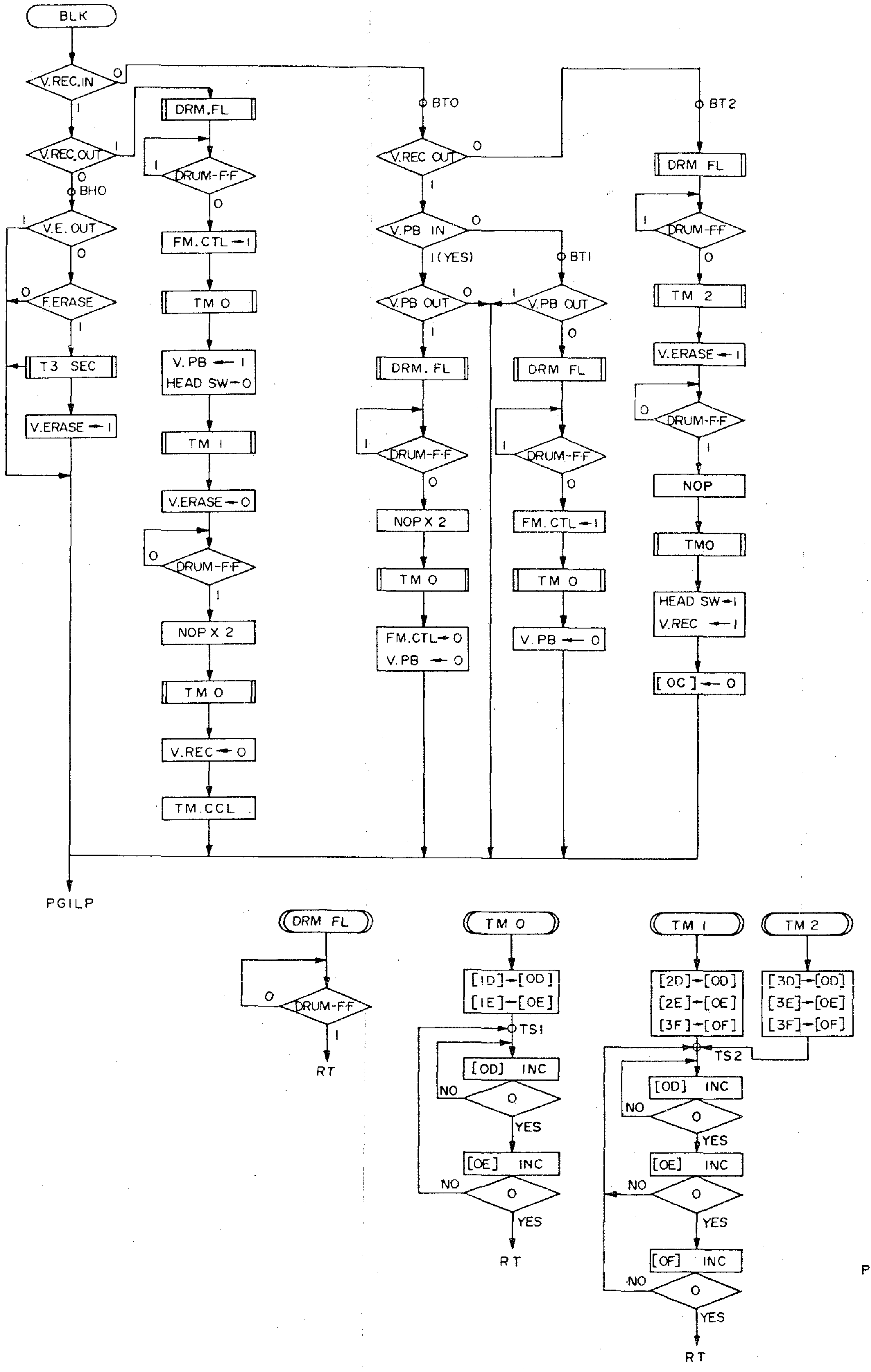

DRUM
DRUM.FF
SB 301
0
1
FFM ← 0
FFM
FFM ← 1
RT
RTS
FGRIZ
CAP.FG
SB201
FG .MEM ← 0
FG.MEM
FG.MEM ← 1
RTS
RT
PROG2
CTRST
EN.MEM
ENMEM 0
DTO → CNT.0
DTO → CNT.1
CNT.2 ← 0
CNT.FLAG ← 1
FLAG.MEM ← 0
CNT UP
FG. RIZ
CNT0 INC
CARRY
CNT1 INC
CNT2 INC
NO
YES
CU02
CNT0=DT0
CNT1=DT1
CU05
=DT20
=DT21
=DT 22
CNT.FLAG ← 0
FLAG.MEM ← 1
TMC0 ← 0
TMC1 ← 0
CU01
FLAG.MEM
TTM
STM5
TMC0 INC
TMC1 INC
FLAG.MEM ← 0
CNT.FLAG ← 1
CU03
CD01
CNT1 = 0
CD02
CNT.FLAG ← 0
FLAG.MEM ← 1

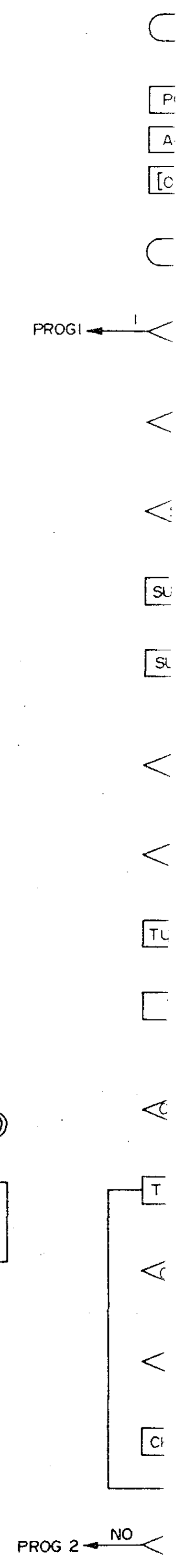
3.1.17 KEY TO ABBREVIATIONS

A	A	: Audio
	ACC	: Accumulltor
	ADB	: Audio Dubbing
	ADUB	: Audio Dubbing
	AFF	: Auto FF
	AFWD	: Auto Forward
	APLY	: Auto Play
	APRL	: Auto Preroll
	APS	: Auto Pause
	ARE. AREW	: Auto REW
	AREC	: Audio REC.
	AREV	: Auto Reverse
	ASS	: Assembly
B	BFWD	: Tape End Forward
	BGN	: Begin
C	CAP	: Capstan
	CAS	: Cassette
	CASS	: Cassette
	CC	: Cassette Compartment
	CCNT	: Capstan Count
	CCLR	: Command Clear
	CK	: Check
	CL	: Clear
	CNT	: Counter
	CSC	: Cassette Switch Check
	CSCK	: Cassette Switch Check
D	DI	: Disable Interruption
	D.L	: Dew Sensor and LED
	D.L.B	: Dew Sensor, Led and Tape Bigen
	DST	: Drum Stop
	DRW	: Draw
	DW	: Down
	D400	: Delay 400 msec
E	E. EDT	: Edit
	EI	: Enable Intterruption
	EJC	: Eject
	EM	: Edit Mode Switch
	EMR	: Emergency
	EMRG	: Emergency
	EN	: Enable
	EPLY	: Edit Play
	EPRL	: Edit Preroll
	EPUS	: Edit Pause
	EREV	: Tape End Reverse
F	F. ERASE	: Full Erase
	FLK	: Flicker
	FWD	: Forward
H	H	: Head
	HF	: Half
I	INC	: Increase
	INIT	: Intial
	INS	: Insert
	INT	: Intial
L	L	: Led
	LCLR	: Led Clear
	LD	: Loading
	LDS	: Loading Switch
	LE	: Loading End
	LF	: Led Flag
	LFS	: Led Flag Set
	LP	: Loop
	LSTL	: Long Still
M	M. MEM	: Memory
	MOT	: Motor
N	–	–
O	–	–
P	P	: Pulse
	PB	: Play Back
	PLY	Play
	PREV	: Preview
	PRL	: Preroll
	PRLP	: Preroll Pause
	PROG	: Program
	PUS	: Pause
Q	–	–
R	RAM	: Random Access Memory
	RC	: Record Command
	REV	: Reverse
	RL	:
	RLES	: Release
	RPTF	: Repeat Flag
	RW	: Rewind
S	SB	: Stand By
	SC	: Scan
	SCS	: Scan Subroutine
	SF	: Switch Flag
	SFW	: Search Forward
	SGN	: Signal
	SOL	: Solenoid
	SP	: Supply
	SR	: Start
	SRH	: Search
	SRV	: Search Reverse
	S.S	: Search, Set
	SST	: Search Start
	SST	: Search Stop
	ST	: Stop
	STIL	: Still
	STL	: Still
	STM	: Set Timer
	STP	: Stop
	STR	: Start
	SUP	: Supply
	SW	: Switch
T	T	: Tape
	TC	: Timer Counter
	TC	: Tension Compensator
	TE	: Tape End
	T. IT	: Test Interruption
	TL	: Tally
	TMC	: Timer Count
	TMM	: Timer Memory
	TTM	: Test timer
	TU	: Take Up
	T6SEC	: 6 Second
U	UNLD	: Unloading
	ULD	: Unloading
V	VIDEO	: Video
W	WRN	: Warning
	WST	: Double Stop
X	–	–
Y	–	–
Z	Z	: Working Area

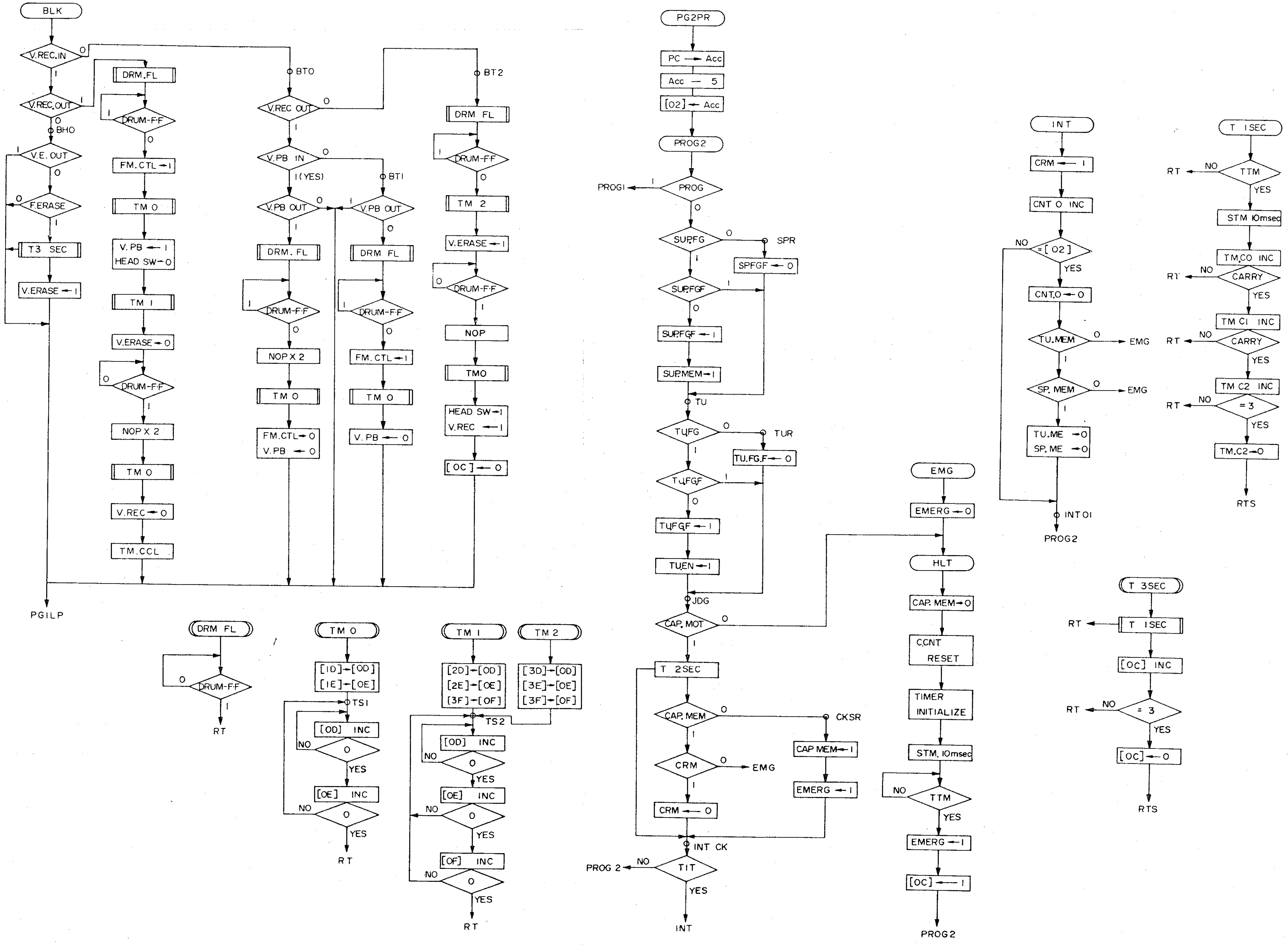
FOR INSTANCE CAP. ST CAPSTAN STOP

3/3 RS510 PROG 2


BLK
V.REC.IN
0
1
V.REC.OUT
1
0
BHO
V.E. OUT
1
0
F.ERASE
0
1
T3 SEC
V.ERASE ← 1
PGILP
DRM.FL
DRUM-F·F
1
0
FM.CTL ← 1
TM 0
V.PB ← 1
HEAD SW ← 0
TM 1
V.ERASE ← 0
DRUM-F·F
0
1
NOP X 2
TM 0
V.REC ← 0
TM.CCL
BTO
V.REC OUT
0
1
V.PB IN
0
1 (YES)
V.PB OUT
0
1
DRM. FL
DRUM-F·F
1
0
NOP X 2
TM 0
FM.CTL ← 0
V.PB ← 0
BT1
V.PB OUT
1
0
DRM FL
DRUM-F·F
1
0
FM. CTL ← 1
TM 0
V. PB ← 0
BT2
DRM FL
DRUM-F·F
1
0
TM 2
V.ERASE ← 1
DRUM-F·F
0
1
NOP
TMO
HEAD SW ← 1
V.REC ← 1
[OC] ← 0
DRM FL
DRUM-F·F
0
1
RT
TM 0
[1D] ← [0D]
[1E] ← [0E]
TS1
[0D] INC
NO
0
YES
[0E] INC
NO
0
YES
RT
TM 1
[2D] ← [0D]
[2E] ← [0E]
[3F] ← [0F]
TM 2
[3D] ← [0D]
[3E] ← [0E]
[3F] ← [0F]
TS2
[0D] INC
NO
0
YES
[0E] INC
NO
0
YES
[0F] INC
NO
0
YES
RT


PROG1
1
PROG 2
NO

3/3 RS510 PROG2



BLK
V.REC.IN
V.REC.OUT
BHO
V.E. OUT
F.ERASE
T3 SEC
V.ERASE ← 1
DRM.FL
DRUM-F·F
FM.CTL ← 1
TM 0
V.PB ← 1
HEAD SW ← 0
TM 1
V.ERASE ← 0
DRUM-F·F
NOP X 2
TM 0
V.REC ← 0
TM.CCL
PGILP
BT0
V.REC OUT
V.PB IN
1 (YES)
V.PB OUT
DRM. FL
DRUM-F·F
NOP X 2
TM 0
FM.CTL ← 0
V.PB ← 0
BT1
V.PB OUT
DRM FL
DRUM-F·F
FM. CTL ← 1
TM 0
V.PB ← 0
BT2
DRM FL
DRUM-F·F
TM 2
V.ERASE ← 1
DRUM-F·F
NOP
TM0
HEAD SW ← 1
V.REC ← 1
[OC] ← 0
0
1
DRM FL
DRUM-F·F
RT
TM 0
[1D] → [0D]
[1E] → [0E]
TS1
[0D] INC
0
NO
YES
[0E] INC
0
NO
YES
RT
TM 1
[2D] → [0D]
[2E] → [0E]
[3F] → [0F]
TM 2
[3D] → [0D]
[3E] → [0E]
[3F] → [0F]
TS2
[0D] INC
0
NO
YES
[0E] INC
0
NO
YES
[0F] INC
0
NO
YES
RT
PG2PR
PC → Acc
Acc − 5
[02] ← Acc
PROG2
PROG1
PROG
SUP.FG
SPR
SPFGF ← 0
SUP.FGF
SUP.FGF ← 1
SUP.MEM ← 1
TU
TU.FG
TUR
TU.FG.F ← 0
TU.FGF
TU.FGF ← 1
TU.EN ← 1
JDG
CAP. MOT
T 2SEC
CAP. MEM
CKSR
CAP MEM ← 1
EMERG ← 1
CRM
EMG
CRM ← 0
INT CK
TIT
NO
PROG 2
YES
INT
EMG
EMERG ← 0
HLT
CAP. MEM ← 0
C.CNT
RESET
TIMER
INITIALIZE
STM. 10msec
TTM
NO
YES
EMERG ← 1
[OC] ← 1
PROG2
INT
CRM ← 1
CNT 0 INC
= [02]
NO
YES
CNT.0 ← 0
TU. MEM
EMG
SP. MEM
EMG
TU.ME ← 0
SP. ME ← 0
INT 01
PROG2
T 1SEC
TTM
RT
NO
YES
STM 10msec
TM.C0 INC
CARRY
RT
NO
YES
TM C1 INC
CARRY
RT
NO
YES
TM C2 INC
= 3
RT
NO
YES
TM.C2 ← 0
RTS
T 3SEC
T 1SEC
RT
[OC] INC
= 3
RT
NO
YES
[OC] ← 0
RTS

3-26

3.2 REEL SAFETY CIRCUIT

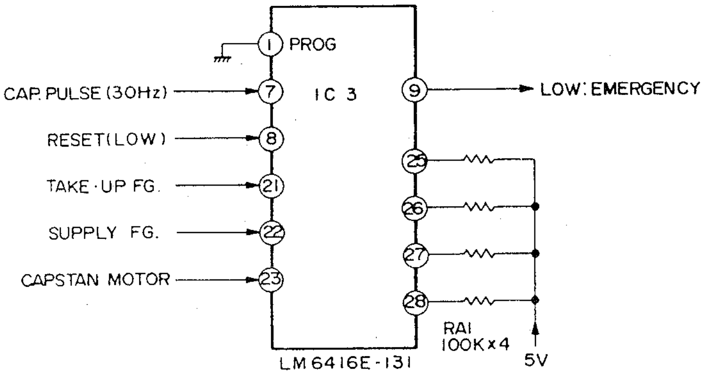

PROG
CAP. PULSE (30Hz)
RESET(LOW)
TAKE·UP FG.
SUPPLY FG.
CAPSTAN MOTOR
IC 3
LOW: EMERGENCY
RAI
100K×4
5V
LM6416E-131
1
7
8
21
22
23
9
25
26
27
28

Fig. 3-18

This circuit detects rotation of the capstan and reel FG using IC3 CPU (LM6416E-131).

1. DELAYED CAPSTAN PULSE

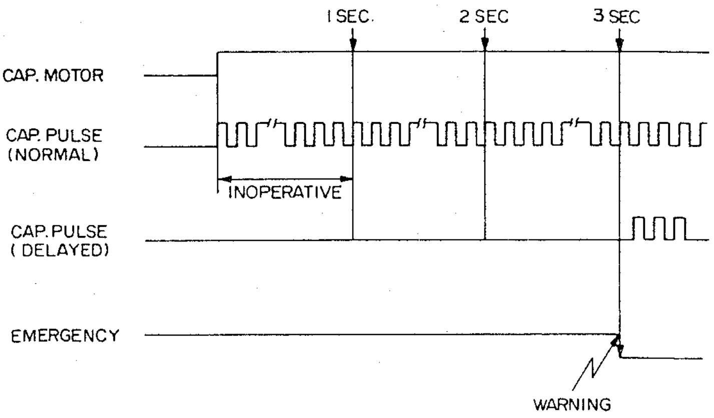

1 SEC.
2 SEC
3 SEC
CAP. MOTOR
CAP. PULSE (NORMAL)
INOPERATIVE
CAP. PULSE (DELAYED)
EMERGENCY
WARNING

Fig. 3-19

1) When capstan pulse duration becomes longer:
   Capstan pulse is not detected for the first one sec. Thereafter, if capstan pulse is not detected for subsequent two sec and sets the warning mode.

2. DELAYED REEL FG PULSE

1) When reel pulse duration becomes longer:
   If no take-up pulse or supply pulse is detected in 10 capstan pulses, the take-up or supply memory is set and sets the warning mode.

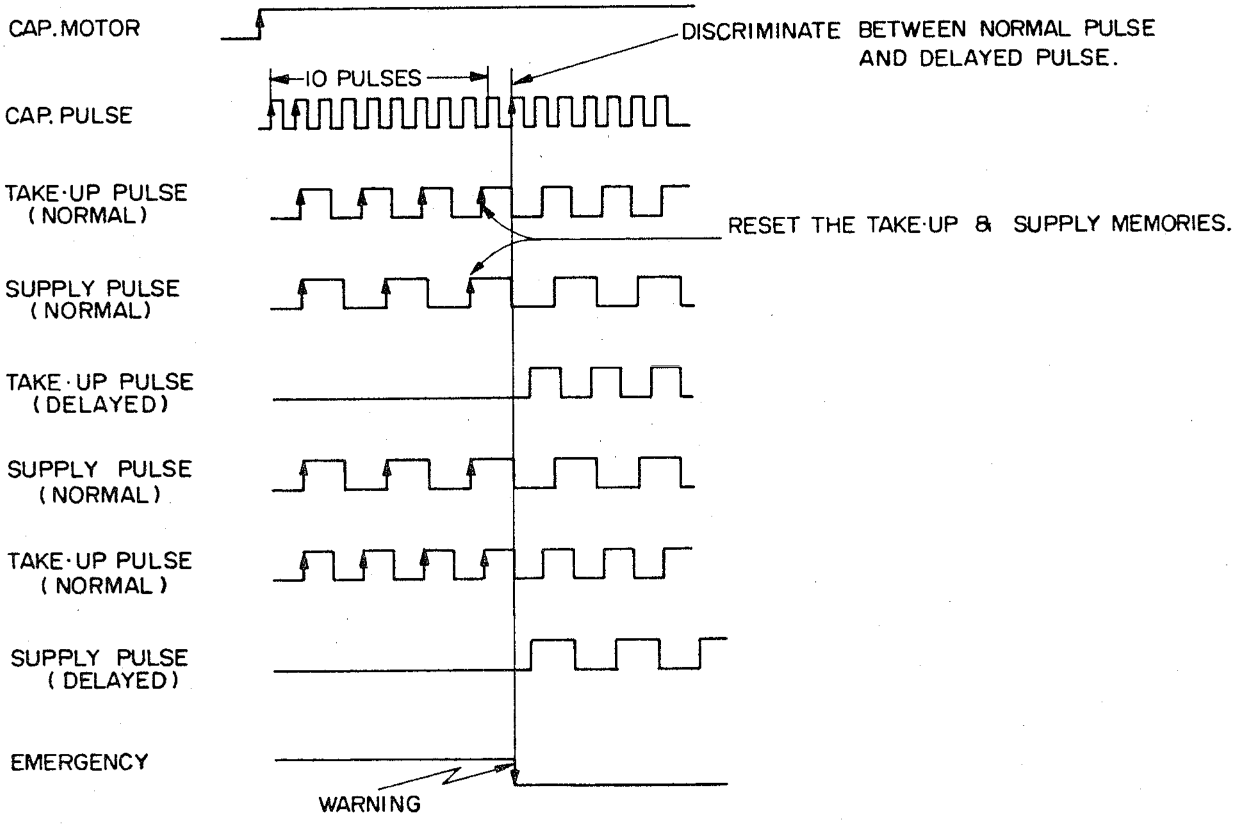

CAP. MOTOR
DISCRIMINATE BETWEEN NORMAL PULSE AND DELAYED PULSE.
10 PULSES
CAP. PULSE
TAKE·UP PULSE (NORMAL)
RESET THE TAKE·UP & SUPPLY MEMORIES.
SUPPLY PULSE (NORMAL)
TAKE·UP PULSE (DELAYED)
SUPPLY PULSE (NORMAL)
TAKE·UP PULSE (NORMAL)
SUPPLY PULSE (DELAYED)
EMERGENCY
WARNING

Fig. 3-20

3.3 COUNTER CIRCUIT

The counter circuit, employing two microcomputers and a fluorescent display tube, is an extremely simple structure. Receiving a command signal from the syscon, this circuit controls the fluorescent display tube so that it displays in the specified mode.

1. IC4 (UPD554C-058) has two built-in counters, each of which has a built-in memory.
   1) One is a counter for counting the capstan pulse (30 Hz). The other is a counter for counting the tape pulse which is a 1/16 count down capstan pulse.
   2) The lap counter counts up to 59 : 59 (only in running mode).
   3) Tape pulse and capstan pulse are counted up/down according to the up/down signal from the syscon.
   4) Zero-out
      When tape pulses are counted and the counter displays zero, high pulses appear at IC4 pin 18 to allow the counter to stop (FF/REW) or to repeat the counting.

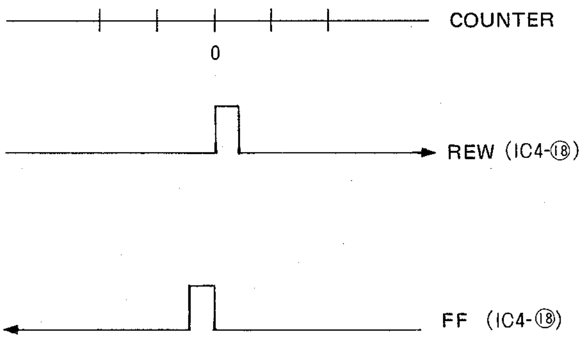


Fig. 3-21

   5) When IC4 PF1 (start) is at high level, data from PE Port is sent to IC5 PA Port.

2. IC5 (UPD554C-055) directly drives the fluorescent display tube.
   1) When IC5 PC 0 (start) is at high level, the lap display is made from minus (not used on this model) and then, time (not used on this model) – 10 min, xx min, 10 sec, xx sec is recorded in the microcomputer at clock timing and displayed on the fluorescent display tube.
   2) Reset . . . . Reset at H pulse
   3) Up/down . . . . Up counter at H pulse and down counter at L pulse
   4) Minus . . . . Minus display at H pulse
   5) Segment . . . . . Segment display at H pulse
   6) Digit . . . . Digit display at H pulse
   7) Capstan pulse . . The fluorescent display tube is used for time display.
   8) Tape pulse . . . . Used for counter zero out.

3. Lap mode switching circuit
   Switching the power SW ON places IC4 (counter) in the tape counter mode. On this model, in order to display the lap counter only, IC2 (non-stable multiplexer) is used for preventing malfunction at time of power ON. In the tape counter mode IC4 pin 8 becomes low level. The low level signal from pin 8 is supplied to IC2 pin 2 to place IC2 in the lap mode. When IC2 is placed in the lap mode, IC4 pin 8 becomes high level, stopping IC2 to operate.

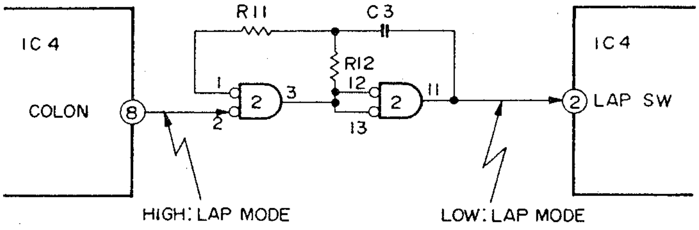


Fig. 3-22

4. Other circuits
   IC3 : This circuit expands the zero-out signal (IC4–18) as it is narrow.
   IC6 : A hexadecimal counter

3.4 VIDEO ERASE CIRCUIT

Q8 switches off when a time code is detected. High potential appears at CD (clear data) pins 3 and 13 of IC1 and IC1 operates.

During insert or assembly editing with a tape than contains a recorded time code, only the vertical blanking interval is not erased.

The timing chart is shown in Fig. 3-23.

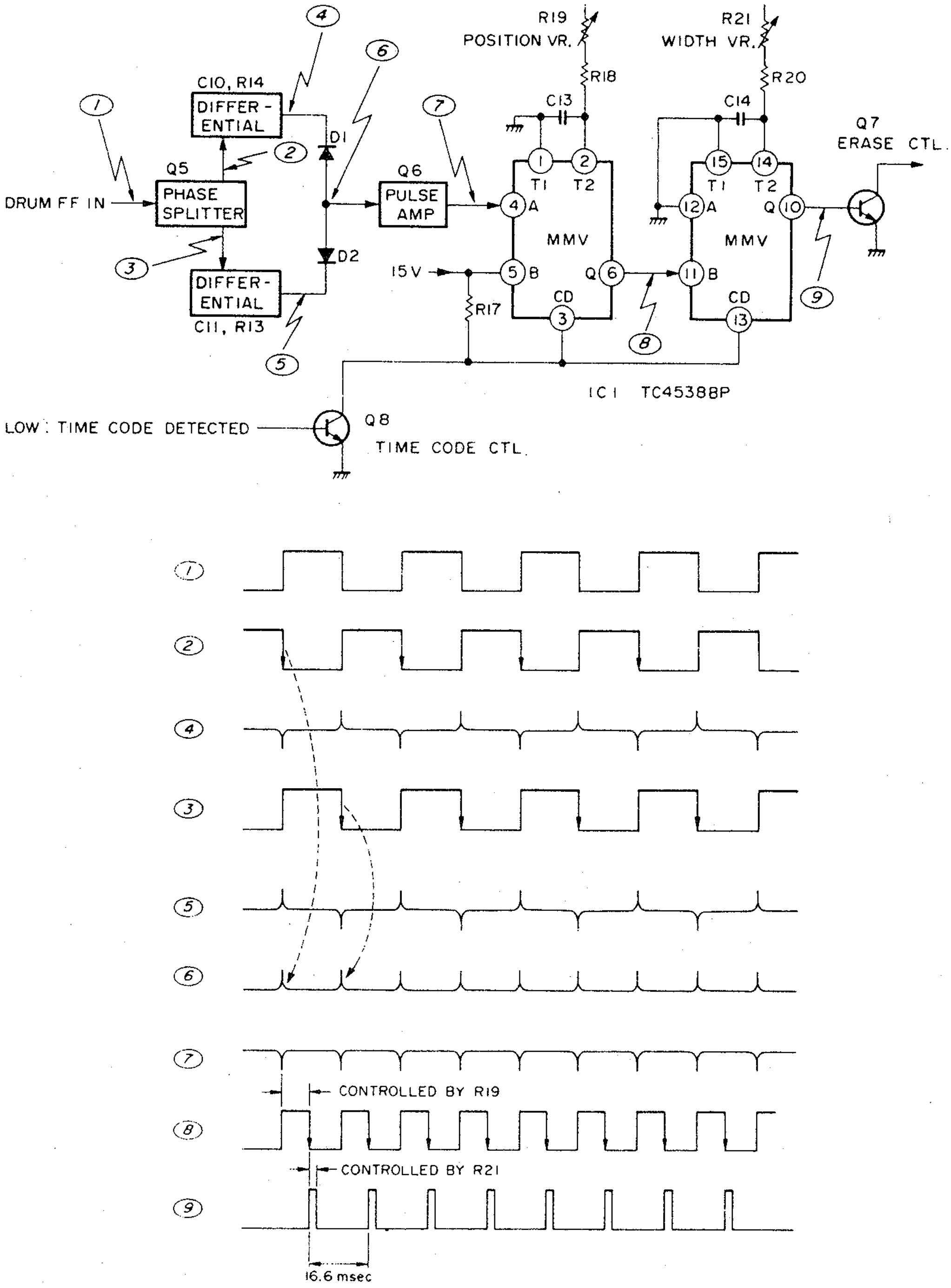

①
②
③
④
⑤
⑥
⑦
⑧
⑨
DRUM FF IN
Q5
PHASE SPLITTER
C10, R14
DIFFER-ENTIAL
DIFFER-ENTIAL
C11, R13
D1
D2
Q6
PULSE AMP
R19
POSITION VR.
R18
C13
R21
WIDTH VR.
R20
C14
T1
T2
A
B
Q
CD
MMV
1
2
3
4
5
6
10
11
12
13
14
15
15V
R17
Q7
ERASE CTL.
IC1 TC4538BP
LOW : TIME CODE DETECTED
Q8
TIME CODE CTL.
CONTROLLED BY R19
CONTROLLED BY R21
16.6 msec

Fig. 3-23

3.5 REEL SERVO SYSTEM

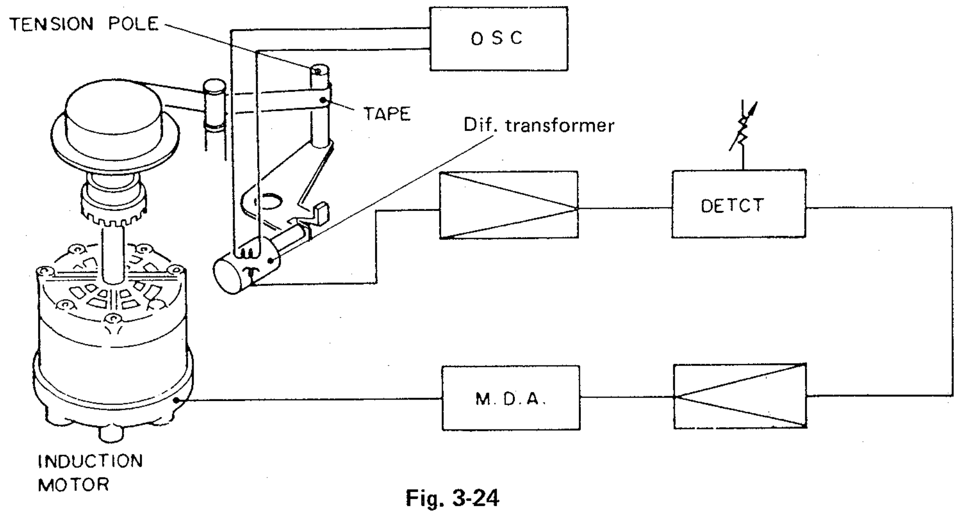


Fig. 3-24

This series (CR-8250E, CR-6650E, CP-5550E) employs two single phase AC induction motors for driving the reel disks and thus avoids the problems of clutch wear and drive system friction found in earlier VCR models. Back tension during playback and tape tension during other modes are completely controlled electrically by voltages applied to the AC motors.

Since the servo systems for the supply and take-up reel disks are the same, only one of these is described in the following. The block diagram is illustrated in Fig. 3-24. The two reel drive motors are identical. Consequently, the induction motor torque becomes the take-up torque. Back tension during playback is applied by the supply side induction motor, and since this corresponds to the take-up torque, control of the torque is performed by the reel servo system.

3.5.1 Characteristics of components

- **Single phase induction motor**

Generally, the relation between torque and rotation is not linear in the case of single phase induction motors, as shown in Fig. 3-25(a). Therefore, they are used in situations where the rotation rate does not vary extensively.

Special designs are used for the reel motors of this model. Although single phase induction motors, the relation between torque and rotation is nearly linear, as with a typical DC motor. (See Fig. 3-25(b).)

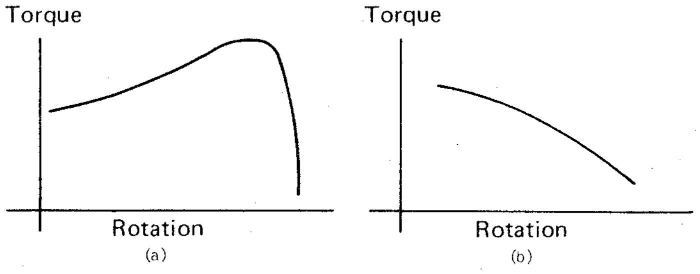


Fig. 3-25

- **Differential transformers**

After loading, differential transformers are used for detecting tape tension. In this model, these transformers function to convert variations in physical length into electrical quantities. A generalized outline of a differential transformer is illustrated in Fig. 3-26.

An oscillator output is applied to primary coil L1, while L2 and L2' are differentially wound secondary coils.

When the core is fully extended, there is no coupling between L1 and L2'. Fig. 3-27(A) shows an instant of the AC, when the oscillator + and – are conducted to the output terminals and current passes freely through L2'. From this point, as the core is moved inward toward the center, coupling begins between L1 and L2'. However, due to the differential winding between L2 and L2', the coupling components cancel, and the output declines, as shown by (B).

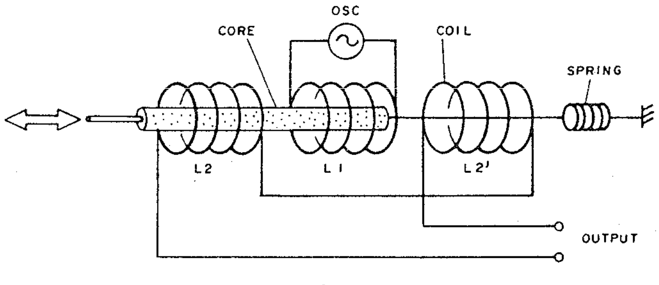


Fig. 3-26

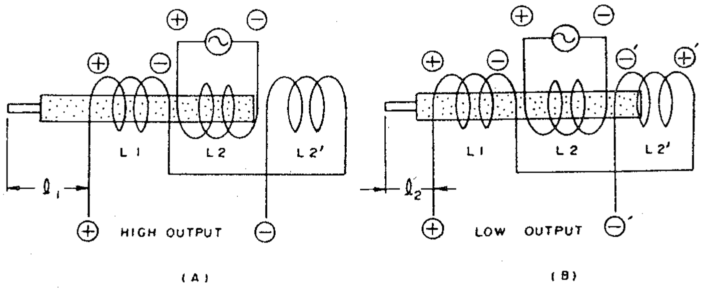


Fig. 3-27

3.5.2 Servo system block diagram

1) 3.5 kHz oscillator
   This circuit produces the AC voltage for operating the differential transformer. See Fig. 3-28.
2) Tuning amplifier
   Amplifies the 3.5 kHz sinewave from the differential transformer.
3) Rectifier
   Detects the 3.5 kHz sinewave and converts it to a DC voltage.
4) DC amplifier
   Amplifies the output of the differential amplifier, which corresponds to tension. This circuit also functions as a filter for preventing resonance in the servo circuit due to relationships between the mechanical resonance point and electrical frequency characteristics.
5) Motor drive amplifier (MDA)
   Supplies power to the motor in accordance with the control signal.

2. Circuit Outlines

- 3.5 kHz oscillator
  This is a type of Clapp oscillator which produces an approx. 3.5 kHz frequency determined by L and C1.
- Output circuit
  Applies the output sinewave from the Clapp oscillator to the differential transformer. The equivalent circuit of the TA7140P monolithic voltage amplifier is shown in Fig. 3-29.

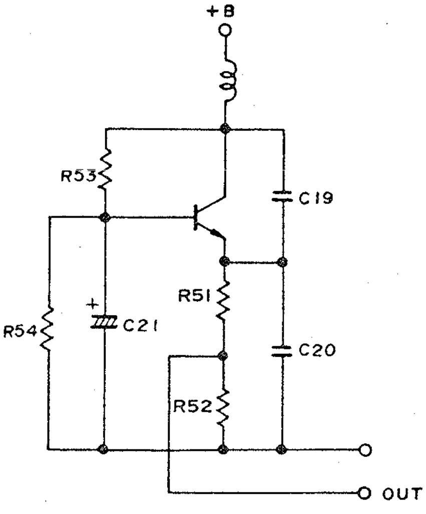

+B
R53
C19
R51
R54
C21
C20
R52
OUT

Fig. 3-28

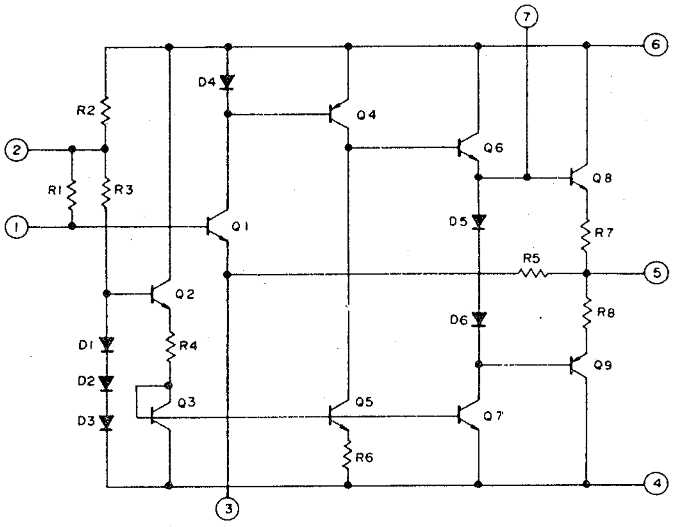

7
6
D4
R2
Q4
2
Q6
Q8
R1
R3
1
Q1
D5
R7
R5
5
Q2
D6
R8
D1
R4
Q9
D2
Q3
Q5
D3
Q7
R6
4
3

Fig. 3-29

- Tuning amplifier
  The tuning amplifier circuit amplifies the output of the differential transformer. High input/output linearity is essential for this amplifier.
  The AC non-inverting amplifier is biased by 1/2 the power supply voltage and its output is centered on V/2. Circuit gain is approx. 20 dB.

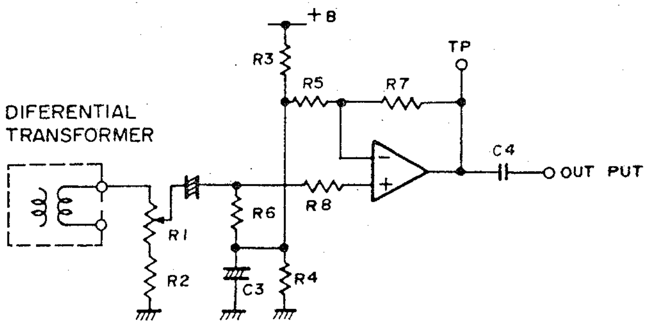

+B
TP
R3
R5
R7
DIFERENTIAL TRANSFORMER
C4
OUT PUT
R6
R8
R1
R2
C3
R4

Fig. 3-30

- Motor drive amplifier
  AC voltage (commercial AC power) applied to the induction motor is controlled by the MDA. This diode and transistor circuit performs control in accordance with the control signal from the reel servo. An outline of the circuit is depicted in Fig. 3-31.

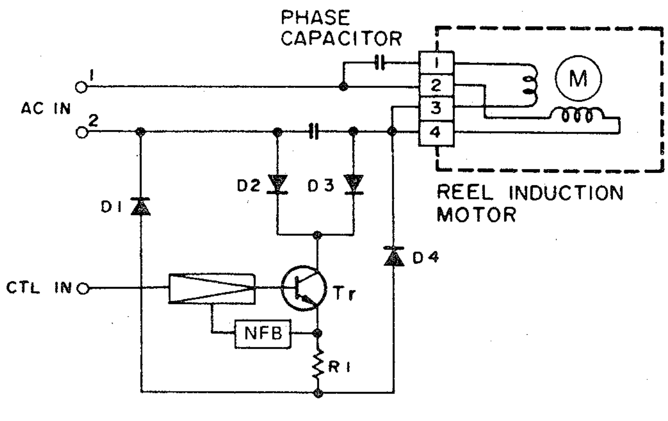

PHASE CAPACITOR
1
2
3
4
M
AC IN
REEL INDUCTION MOTOR
D2
D3
D1
D4
CTL IN
Tr
NFB
R1

Fig. 3-31

When an AC voltage is applied to terminals 1 and 2, the voltage goes through D_3 to motor terminals 2 and 4. The resistance of the transistor varies in accordance with the control signal and, via the transistor, the voltage goes through diode D_1 to terminal 2. In the reverse direction, the route becomes Terminal 2 → D_2 → Transistor → D_4 → motor → Terminal 1.

In the above manner, the AC voltage is rectified by D_1 through D_4 and current always flows in one direction through the transistor. The voltages applied to the induction motors in each mode are shown in Fig. 3-32.

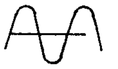
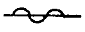
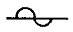
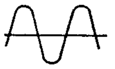
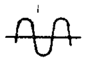
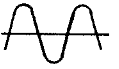
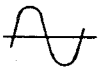
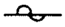
MODE	SUPPLY SIDE	TAKE UP SIDE
STOP	BRAKE	BRAKE
REW	 TORQUE LARGE	 TORQUE SMALL
FF	 TORQUE SMALL	 TORQUE LARGE
PLAY	 TORQUE MEDIUM	 TORQUE LARGE
PREROLL	 TORQUE LARGE	 TORQUE SMALL

Fig. 3-32

3.5.3 Reel servo system description

Play mode

If tension at the take-up side is too high, the tension pole is pressed by the tape and the core shifts inward. As a result, the differential transformer output declines. This is rectified and applied to the + side of a differential amplifier, and the DC output declines. The DC level is supplied to the motor drive amplifier, reducing motor rotation. Consequently, the take-up torque declines and normal tension is maintained.

Conversely, if the supply side tension is too high, the core shifts toward the take-up side and the oscillator input increases. This is rectified and applied to the inverting input of the IC1 (pin 6), and the DC output declines. During the Play mode, the tape pulls the supply reel motor, which electrically speaking, is being driven in the opposite direction of its rotation. This reverse direction force becomes the back tension. Therefore, if the motor drive output declines, the motor rotation increases and tension is reduced.

	Tension strong ——→ weak			
Reel servo	Core	OSC in	DC out	Motor torque
T.U.	inward →	low →	declines →	decreases
SUP	outward →	high →	declines →	decreases

Play (Rec) mode

Table 3-6

3.5.4 Electronic switches

Various conditions determine the on and off states of the reel servo circuit switches. Among their functions are to perform tension servo and speed servo switching, and to apply fixed tension reference voltage (skew) during recording. The in/out pins of the IC switches conduct when high is applied to the arrow marked control pins.
Switch functions are indicated in the following table.

	IC	PIN No. IN/OUT	SW. NAME	FUNCTION
Supply side	IC7	10, 11	REEL STORE	ON during Store and apply a fixed voltage (divided by R40 & R41).
	IC8	1, 2	SUP. T. CONTROL	ON during PLAY/REC, FF/REW and apply supply tension servo.
		3, 4	REEL DAW	ON during Draw and apply a fixed back tension (voltage divided by R37 & R38).
		8, 9	B. REEL REW	Rewind torque for Reverse is applied for a few seconds when the tape reaches the end.
		10, 11	B. REEL FF	Apply FF back tension for a few seconds when rewound to beginning of tape.
	IC10	1, 2	LONG STILL	When maintained in Still mode for several minutes, turn the MDA input voltage to 0 and remove tension.
		10, 11	SKEW	OFF during Recording and a fixed tension determined by R15 is applied. ON during Playback and Supply back tension can be changed with skew control.
	–	Transistor Q1	LONG STILL SUP. T. CTL	To achieve fast stabilizing, when switched to Play from Long Still or Stop, short C7 and C8, short pins 6 and 7 of IC4 and achieve optimum voltage for Play determined by R15.
Take-up side	IC7	1, 2	REEL STORE	ON during Store, fixed rewind torque achieved.
	IC9	1, 2	B. REEL REW	When the tape end is reached, apply a few seconds of REW back tension.
		3, 4	REEL DRAW	ON during Draw, apply a fixed back tension (voltage divided by R91, R92).
		8, 9	TU TENSION CONTROL	ON during PLAY/REC, FF/REW. Apply take-up tension servo.
		10, 11	B. REEL FF	When rewound until the beginning of the tape, apply a few seconds of FF back tension.
	IC10	3, 4	TU T. CTL	ON during Stop, Load/Unl. Place optimum voltage beforehand to decrease time for stabilizing when switched to PB mode.
Sup/TU side	–	Transistor Q2	CAP. REV	During REV, change the setting voltage of the tension servo.
	–	Transistor Q3	REEL STILL	Since CAP. REV command is in effect during Still mode, turn Q2 off.

Table 3-7

3.6 SERVO SYSTEM

The servo system functions to regulate the rotation of the video heads (head drum) and the tape transport. A special drum motor is used which incorporates a Hall element. It is thus necessary to only control the drum motor.

Capstan rotation is also controlled by a special Hall element type direct coupled motor. The principle of the servo system is shown in Fig. 3-33.

	Drum Servo	Capstan Servo
Reference Signal	External sync input, video signal or in absence of either of these, crystal	Reference signal sent from drum servo
Comparison Signal	Output of pickup head mounted to drum	Play: CTL signal from control head Record: 25 Hz divided from 450 Hz capstan FG
FG	Converted to servo voltage by sampling	Converted to servo voltage by sampling

Table 3-8

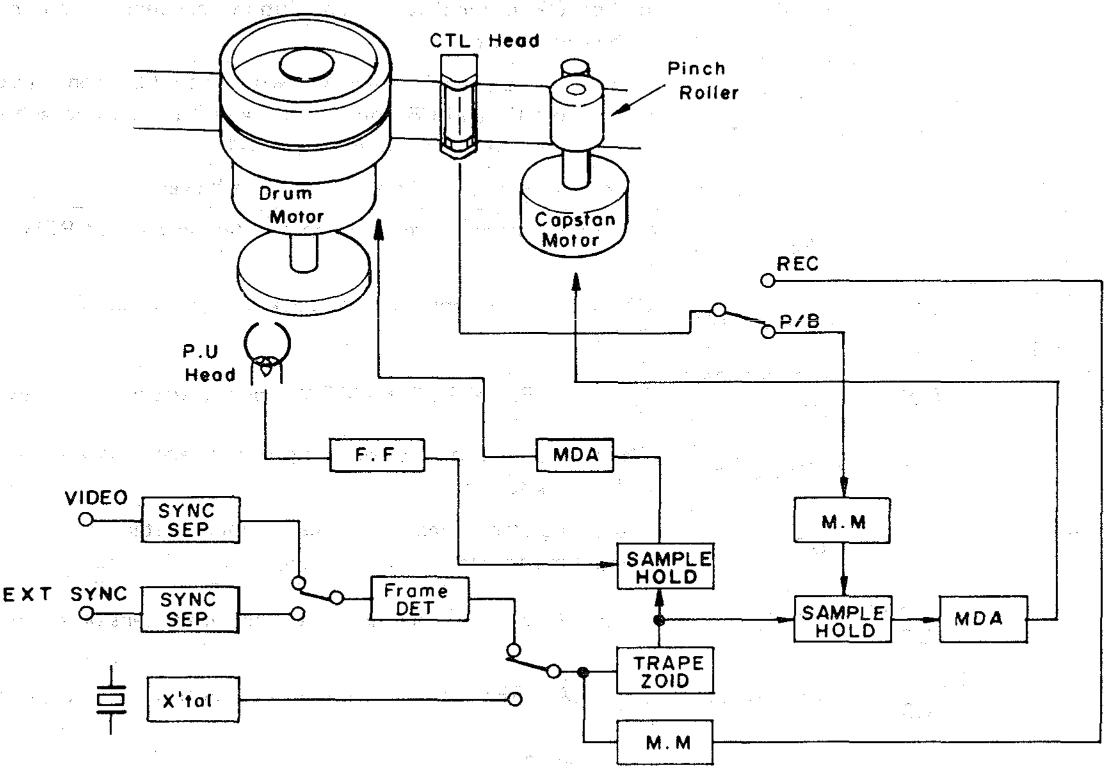

CTL Head
Pinch Roller
Drum Motor
Capstan Motor
REC
P/B
P.U Head
F.F
MDA
VIDEO
SYNC SEP
EXT SYNC
SYNC SEP
Frame DET
SAMPLE HOLD
M.M
SAMPLE HOLD
MDA
TRAPE ZOID
X'tal
M.M

Fig. 3-33

■ Reference signal

The reference sync signal for the servo systems during recording and playback differs as illustrated below, depending on the settings of the SYNC and INPUT select switches and the conditions of the signals applied to the input terminals.

These can be expressed in the form of a table as follows:

EXT input	Input video		SYNC SELECT SWITCH	
			EXT	VIDEO
YES	YES	locks to	EXT INPUT	INPUT VIDEO
YES	NO		EXT INPUT	INT. SSG
NO	YES		INPUT VIDEO	INPUT VIDEO
NO	NO		INT. SSG	INT. SSG

Table 3-9

■ Frame servo

The standard television signal consists of odd and even fields. In video recording equipment, by convention, the odd field is recorded and played back by the channel 2 (CH2) head and the even field by the channel 1 (CH1) head. The main purpose of this convention is convenience in editing, i.e., so that edits start with the odd field and end with the even field. This drum servo (or frame servo, as it is sometimes called) differentiates between the odd and even fields by detecting the equalizing pulse within the television vertical sync signal.

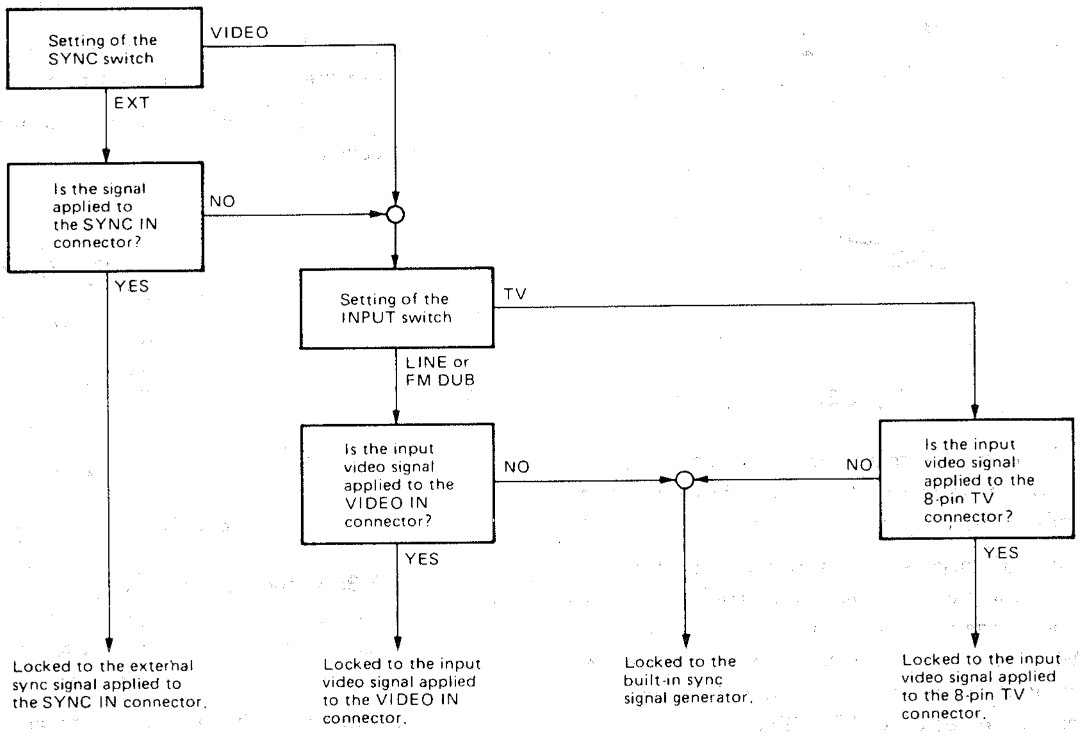

Setting of the SYNC switch
VIDEO
EXT
Is the signal applied to the SYNC IN connector?
NO
YES
Setting of the INPUT switch
TV
LINE or FM DUB
Is the input video signal applied to the VIDEO IN connector?
NO
YES
NO
Is the input video signal applied to the 8-pin TV connector?
YES
Locked to the external sync signal applied to the SYNC IN connector.
Locked to the input video signal applied to the VIDEO IN connector.
Locked to the built-in sync signal generator.
Locked to the input video signal applied to the 8-pin TV connector.

Fig. 3-34

3.6.1 Description of components

- Drum and Capstan motors

Although different in external appearance, the drum and capstan motors employ the same construction and operating principles. These are brushless, coreless type motors utilizing Hall elements. Construction of the drum motor, including the lower drum, is indicated in Fig. 3-35.

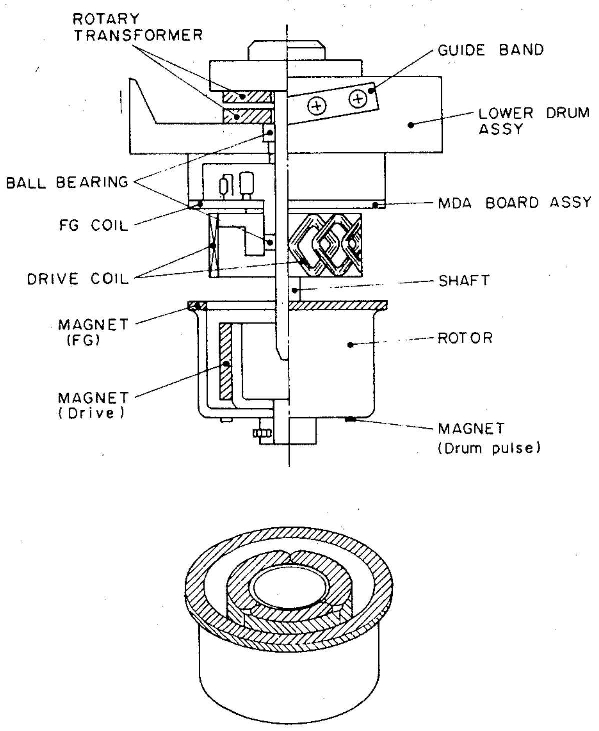


Fig. 3-35

During service, the entire assembly is replaced, including the lower drum. However, the figure shows the motor cover removed and the rotor taken out.

Three types of magnets are provided with the rotor. Magnets for the frequency generator are located at the upper edge of the rotor, while the FG coils are printed on the MDA board. As the rotor turns, electromagnetic induction produces pulses in the coils. FG pulse count is 118 per rotation of 25 x 118 = 2950 Hz.

The FG output is proportional to the motor rotation. If the output frequency varies, the variation is detected and the servo circuit operates.

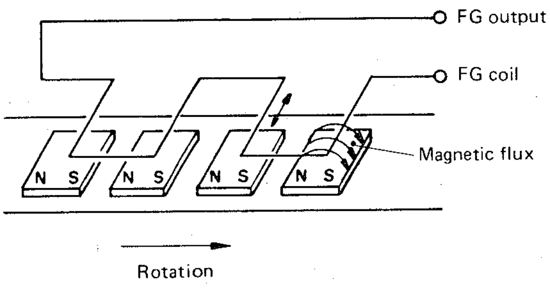


Fig. 3-36

Two magnets are located at the bottom of the rotor. These, together with a pickup head, produce the drum pulse.

The rotor turns by interaction of three magnets secured in the inner portion of the rotor and the drive coils of the lower drum. This principle is described below.

- Hall element

This is a type of semiconductor which utilizes the Hall effect. As illustrated in Fig. 71, when control current I_c flows through a conductor and magnetic flux B is applied perpendicularly, voltage V_H becomes produced perpendicularly (3-dimensionally) to both I_c and B. This relationship can be expressed by the formula:

$$V_H = R_H \times \frac{I_c \times B}{d}$$

In the above, R_H = material constant (Hall coefficient)
d = conductor thickness

The Hall elements function to detect the relative positions of the rotor poles and stator coils.

In addition, FG servo circuits are provided for the drum and capstan motors.

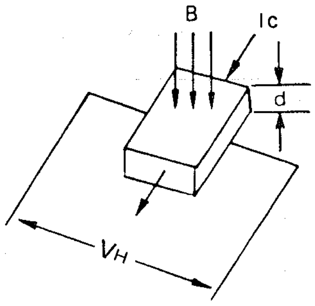


Fig. 3-37 Hall element

Fig. 3-38 shows a 2-dimensional rendition of the magnet and coil configuration. The motor contains 4 sets of 3 coils each, together with a switching circuit for sequentially switching the current flow.

The rotor magnets are secured to an iron case and, as shown by the dotted lines in the figure, magnetic flux passes between the coils. At the stator, coils and Hall elements are attached with the Hall elements mechanically positioned with 30° separation from each other.

Assume for example, that a magnet (rotor) comes to a position where Hall element HG1 terminal C is high (D is low) and terminal E low (F is high). IC4 switches on, sending a high output through a diode to the invert input of IC1, cutting off IC1. Terminal E of HG2 is low, cutting off IC2 and low at terminal D of HG2 cuts off IC3. As a result, only X4 is on and control current from the MDA flows in the coil.

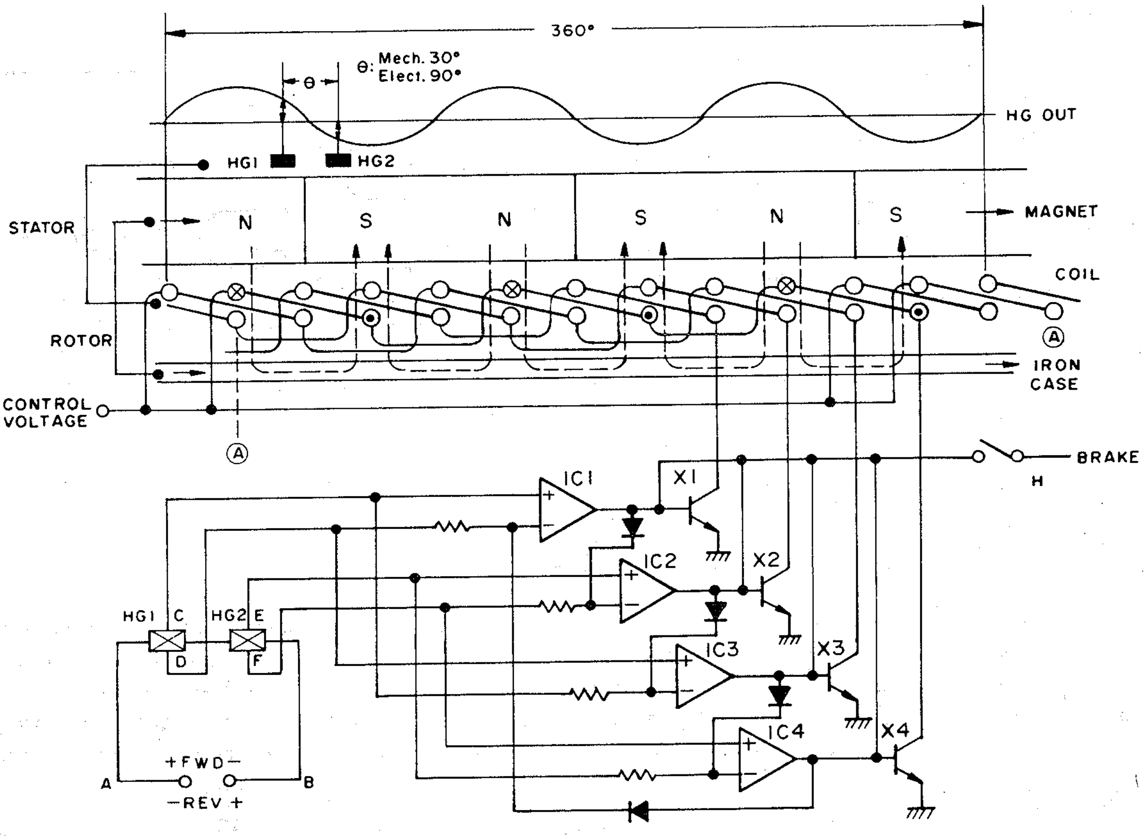

360°
θ: Mech. 30° Elect. 90°
θ
HG OUT
HG1
HG2
STATOR
N
S
N
S
N
S
MAGNET
COIL
ROTOR
Ⓐ
IRON CASE
CONTROL VOLTAGE
Ⓐ
BRAKE
H
IC1
X1
IC2
X2
IC3
X3
IC4
X4
HG1
C
D
HG2
E
F
+FWD−
A
B
−REV+

Fig. 3-38

Applying Fleming's left hand rule to the coil current example shown in the figure, force is imparted which tends to move the coil toward the left. However, since the coil is fixed, the magnet moves correspondingly toward the right.

After rotating 30°, the magnet sets HG1 C high, D low, and HG2 E high and F low. Only IC1 and X1 switch on. In the same manner, in sequence, X2, X3 and X4 are switched, coil current flows, and the rotor continues to turn.

Capstan motor functions include reversible direction, speed and stop modes. Changing the direction is accomplished by changing the current flow direction in the Hall elements. Still and Pause are produced by switching all transistors on. At this time, the control voltage ceases and reverse current flows in the route: ground → X1 to X4 → coil → X23 & X24 (capstan servo board) → ground. The coil then functions as an electromagnetic brake.

A fixed relationship must be maintained between the positions of the drum pulse magnets and video heads in order to ensure correct head switching. If for some reason, the rotor is removed, reassemble with the rotor positioned as shown in Fig. 3-39, then adjust electrical switching point position.

The CH-2 video head (red lead wire) is separated by approx. 9.5 mm from the rightmost screw securing the lower drum guide band. Position the N pole of the rotor magnet precisely at the center of the pickup head, then tighten the rotor setscrew.

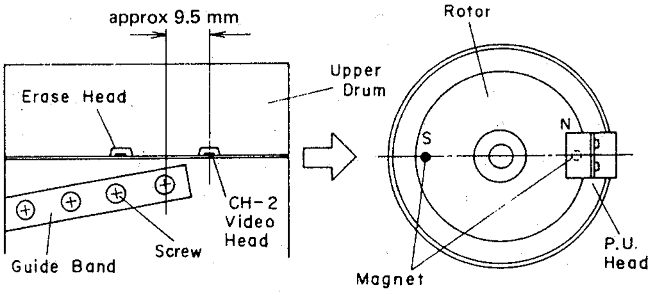

approx 9.5 mm
Erase Head
Upper Drum
Rotor
S
N
CH−2 Video Head
Screw
Guide Band
Magnet
P.U. Head

Fig. 3-39

Both the capstan and drum motors contain built-in motor drive amplifiers. Motor terminals are indicated in the following table.

Terminal	Function	
	Capstan motor	Drum motor
1	GND: Ground	GND: Ground
2	C.V.(Control Voltage): Drive input	C.V.(Control Voltage): Drive input
3	Brake: High for braking at Still	–
4	12 V: Power supply voltage	12 V: Power supply voltage
5	Cap. Rev.: High at Reverse & Still	–
6, 7	FG: FG output	FG: FG output

Table 3-10

3.6.2 Drum servo system

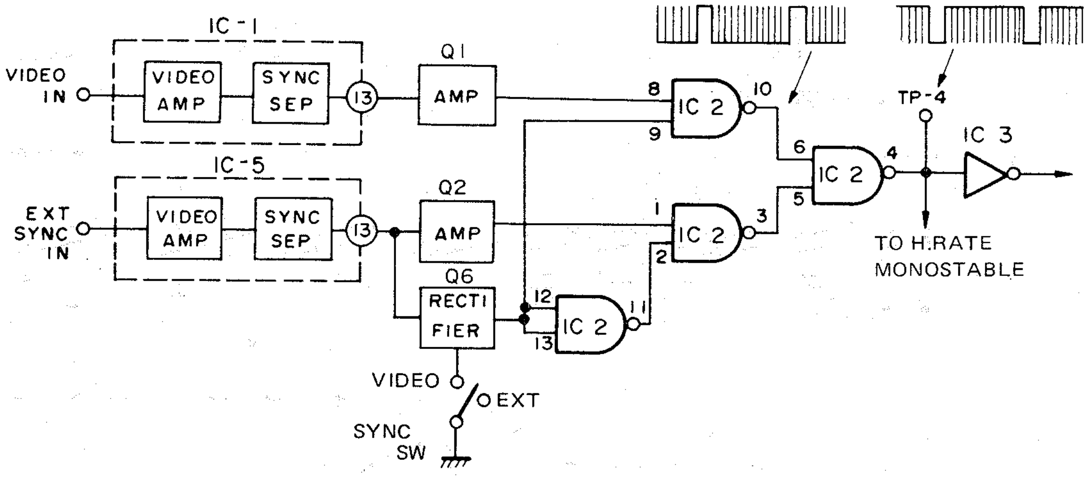

IC-1
VIDEO IN
VIDEO AMP
SYNC SEP
13
Q1
AMP
IC-5
EXT SYNC IN
VIDEO AMP
SYNC SEP
13
Q2
AMP
Q6
RECTI FIER
8
9
IC 2
10
1
2
IC 2
3
12
13
IC 2
11
6
5
IC 2
4
TP-4
IC 3
TO H.RATE MONOSTABLE
VIDEO
EXT
SYNC SW

Fig. 3-40

- External sync/video sync selection
  When the Sync switch is set to EXT (external) and an external sync signal supplied, rectifier Q6 output goes low. This low is sent to IC2 pin 9 and the VIDEO IN signal does not appear at IC2 pin 10.

  The EXT SYNC IN signal is connected to IC2 pin 1 and with high at IC2 pin 2, the inverted output appears at pin 3. In order to use an external sync signal in this manner, it must be applied to EXT SYNC IN and at the same time, the SYNC switch must be set to EXT.

  If an external sync signal is not supplied, but the SYNC switch set to EXT, due to the high rectifier output (Q6 collector), the EXT SYNC IN gate (IC2 pins 1, 2 and 3) is switched off and the VIDEO IN gate (IC2 pins 8, 9 and 10) is switched on. At this time, if a video input is present, synchronization becomes taken from the video signal.

- Frame detector
  The frame detector block diagram is shown in Fig. 3-41.

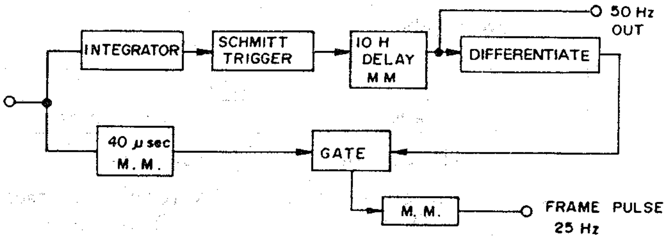

INTEGRATOR
SCHMITT TRIGGER
10 H DELAY M M
DIFFERENTIATE
50 Hz OUT
40 μsec M.M.
GATE
M. M.
FRAME PULSE 25 Hz

Fig. 3-41

The input signal is divided into two lines. One of these goes through an integrator circuit for detecting the position of the equalizing pulse. After waveform shaping, the signal from the integrator circuit is applied to a Schmitt trigger. A monostable delays the Schmitt trigger output by 10 H and through a differential circuit, the pulse falling component becomes the sampling pulse for frame detection.

In the second route, the input signal goes to a 40 μsec monostable. Since this is shorter than the 62 μsec horizontal sync period, but greater than half that period, a squarewave becomes triggered every horizontal sync period without regard to the equalizing pulse (1/2 H).

By gating the 40 μsec monostable output with the frame detector sampling pulse, since the equalizing pulse position differs between odd and even fields, the fields can be distinguished by the presence or absence of sampling.

- Frame Detector circuit
  External sync or video appears at IC2 pin 4. An integrator circuit is formed by R13 and R15, C14 and C15. The output of the IC3 Schmitt trigger appears at TP5. IC8 is an approximately 10 H delay monostable. The rise component of the Schmitt trigger is inverted by IC3 and the sampling pulse appears at TP11. At TP10, the H rate pulse with 40 μsec time constant from IC6 monostable appears. These are gated at IC7 to produce the frame pulse.

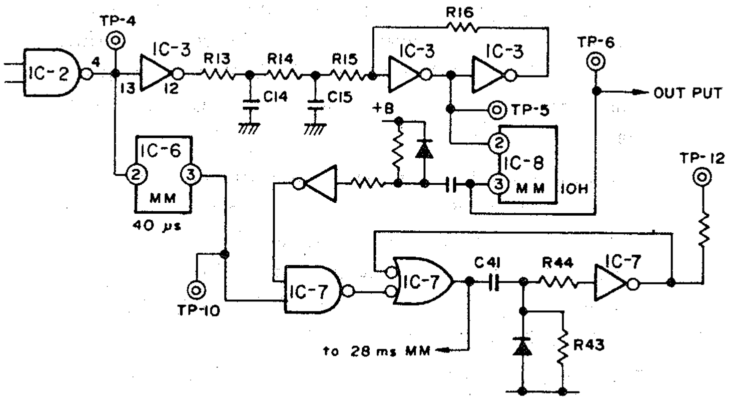
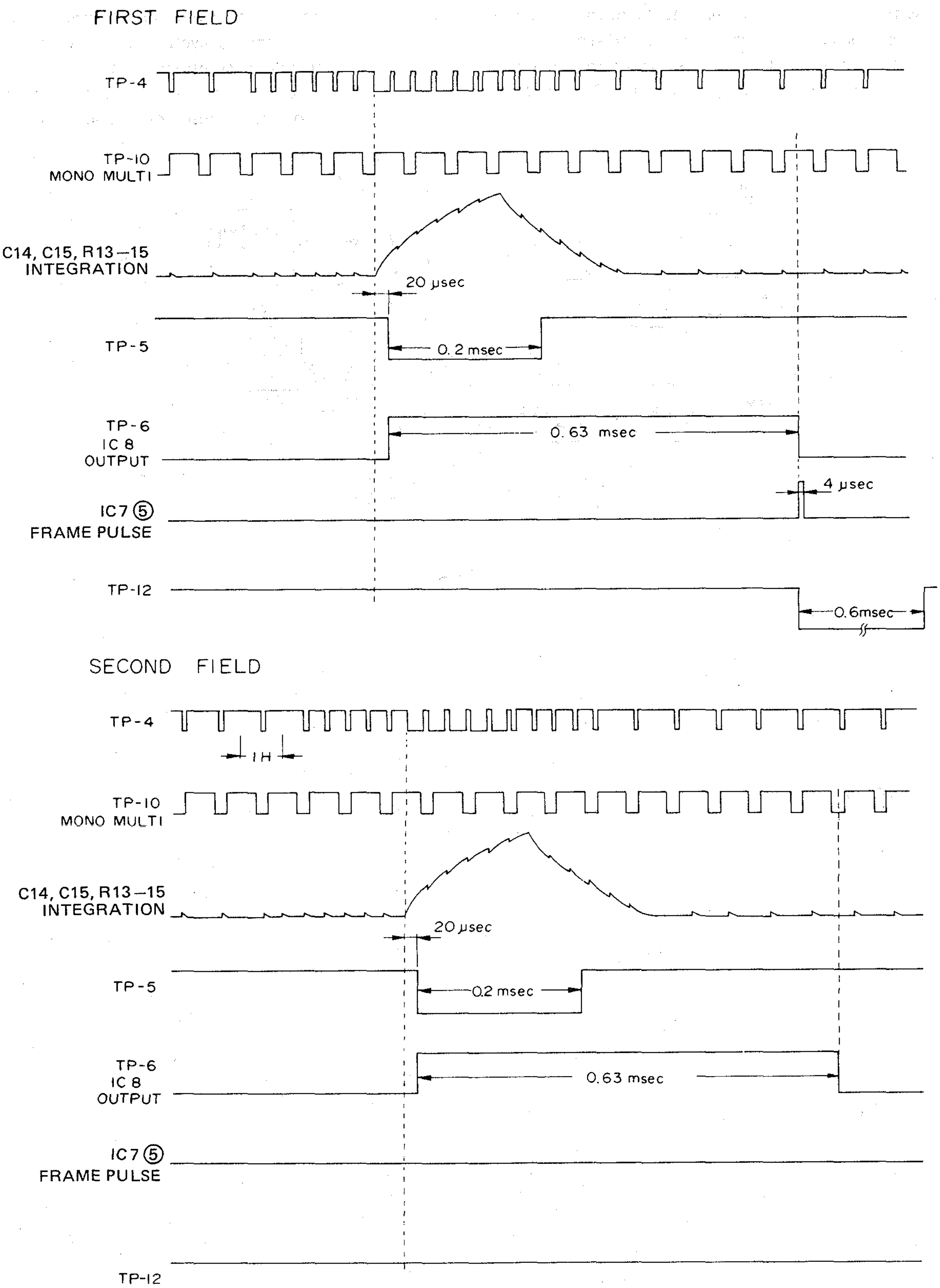

TP-4
IC-2
4
13
IC-3
12
R13
R14
R15
C14
C15
R16
IC-3
IC-3
TP-6
OUT PUT
+B
TP-5
IC-8
2
3
M M
10H
TP-12
IC-6
2
3
MM
40 μs
TP-10
IC-7
IC-7
C41
R44
IC-7
to 28 ms MM
R43

Fig. 3-42

The frame pulse is present at IC7 pin 3, however, in practice only the rising component is used. Because of the very narrow V rate component of the frame pulse at IC7 pin 4, the monostable of IC7 (time constant determined by C41, R43 and R44) functions to expand the width and permit monitoring at TP12.

Timing chart of the frame pulse detector is shown in Fig. 3-43.



FIRST FIELD
TP-4
TP-10
MONO MULTI
C14, C15, R13–15
INTEGRATION
20 µsec
TP-5
0. 2 msec
TP-6
IC 8
OUTPUT
0. 63 msec
4 µsec
IC7 ⑤
FRAME PULSE
TP-12
0. 6msec
SECOND FIELD
TP-4
1H
TP-10
MONO MULTI
C14, C15, R13–15
INTEGRATION
20 µsec
TP-5
0.2 msec
TP-6
IC 8
OUTPUT
0.63 msec
IC7 ⑤
FRAME PULSE
TP-12

Fig. 3-43

Presence of an external sync signal or a video signal is detected and Q3 switched on. The SSG input is not obtained at IC4 pin 3 and the output becomes a 10 H delay pulse produced from the input signal.

Q3 is off in absence of either external sync or video. IC4 pin 12 goes high and the pulse from the SSG is obtained from IC4 pin 3. If the FRAME switch is off, Q7 becomes cutoff and the IC4 pin 3 output is simply inverted by Q8 and sent to IC10. At this time, the trapezpoidal waveform phase can be either that of the odd or even field. See Fig. 3-44.

The circuit diagram of Fig. 3-44 and the timing chart of Fig. 3-45 indicate the FRAME switch function. Assume, for example, that the FRAME switch is off and the trapezoid rises at the wrong (even) field (just prior to "frame switch on" of Fig. 3-45).

The 50 Hz sync signal appears at IC4 pin 3 (wavefrom a). This sync signal triggers IC10 to produce a trapezoid (waveform b) which goes to Q5 base. The falling component of IC1 monostable is not employed, however, in order to prevent retriggering of the 11 msec monostable by noise or exter-

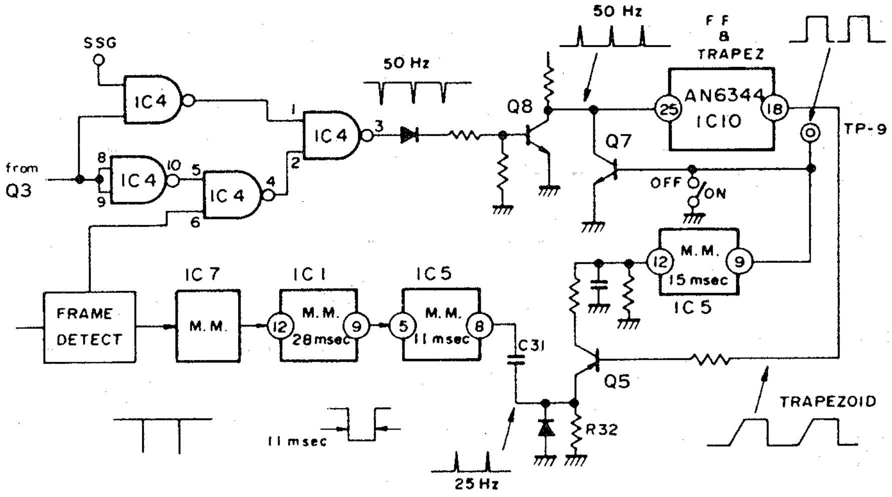

SSG
IC4
IC4
IC4
IC4
from Q3
1
2
3
4
5
6
8
9
10
50 Hz
50 Hz
Q8
Q7
F F & TRAPEZ
AN6344
IC10
25
18
TP-9
OFF
ON
M.M.
15 msec
IC 5
12
9
FRAME DETECT
IC 7
M.M.
IC 1
M.M.
28msec
IC5
M.M.
11 msec
5
8
C31
Q5
R32
TRAPEZOID
11 msec
25 Hz

Fig. 3-44

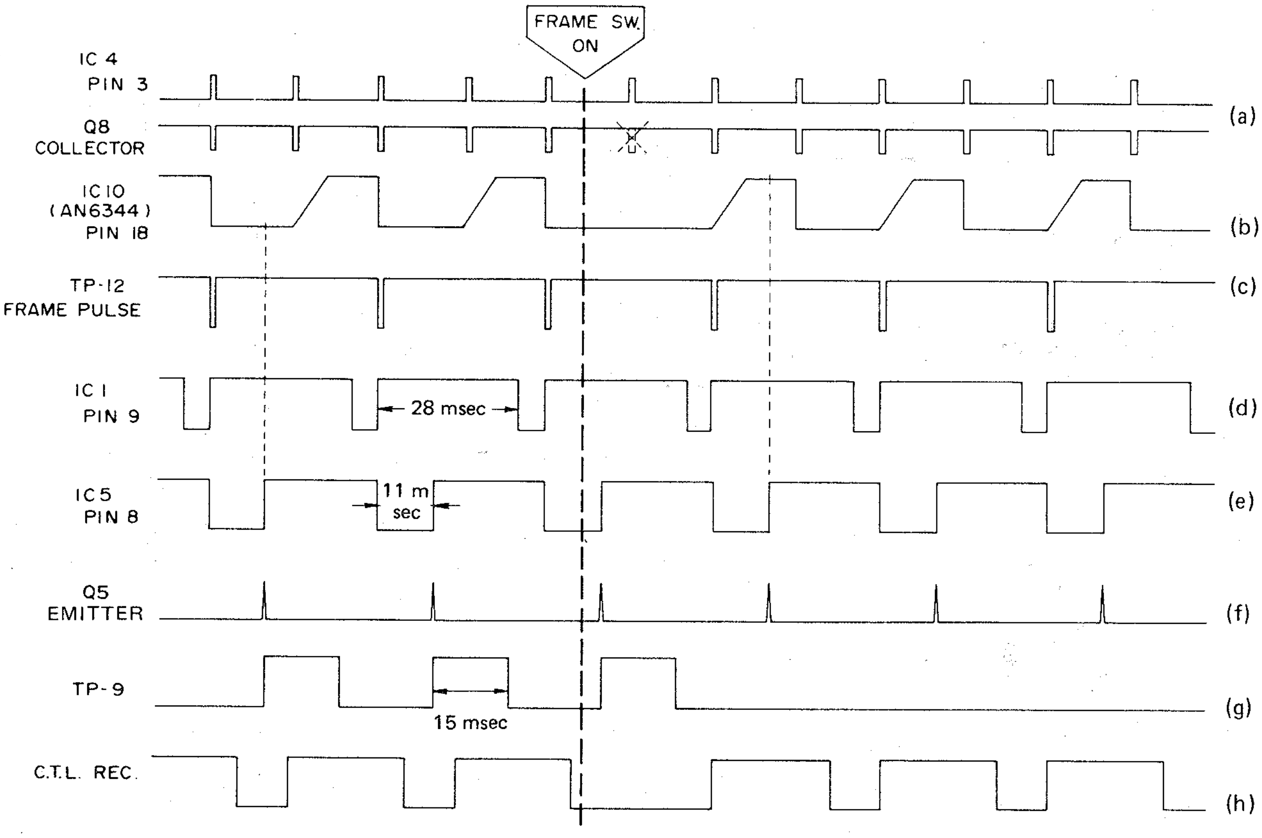

FRAME SW. ON
IC 4 PIN 3
Q8 COLLECTOR
IC10 (AN6344) PIN 18
TP-12 FRAME PULSE
IC 1 PIN 9
IC5 PIN 8
Q5 EMITTER
TP-9
C.T.L. REC.
28 msec
11 m sec
15 msec
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)

Fig. 3-45

nal interference in the V rate period, high is maintained for as long as possible within this period (waveform d).

As mentioned above, IC7 monostable is for pulse monitoring. The resulting frame pulse (waveform c) is simply delayed 11 msec by IC5 monostable (waveform e) and applied to Q5 emitter (waveform f). Consequently, when the input is even with the low period of the trapezoid, Q5 switches on an triggers the 15 msec monostable of IC5 (waveform g).

At this time, if the FRAME switch is set to on and this 15 msec output is in phase with the Q8 even field pulse, Q7 switches ON. After FRAME switch on, the first even field pulse becomes grounded. At this point the trapezoid is not produced, but at the next odd field, the trapezoid rises. In other words, the frame servo is applied from this point and the CTL pulse becomes recorded in the proper field.

Once the frame servo is applied and the pulse input of Q5 emitter matches the phase of the trapezoid plateau, Q5 cannot switch on. Outputs are not obtained from the 15 msec monostable or TP9.

Cutting off the Q7 in the actual circuit is achieved through D21, R49, D25 and not through dirctly grounding the Q7 base with theframe switch. In other words, when the frame servo switch is turned ON, the IC5 pin 9 output pulse turns Q7 ON passing through R150, R49 and D25. When the Frame Servo Switch is turned OFF, Q7 base becomes L thereby continuously cutting Q7 OFF because D21 is grounded.

Furthermore, even if recording is attempted by mistake, with the frame switch in the OFF position, Q23 and Q24 are turned ON when the drum starts rotating and the IC5 pin 9 output enters the Q7 base passing through Q23 and Q19, activating the frame servo immediately. Once the frame servo is activated, it does not matter even if the Q7 is kept OFF.

When a non-interlaced signal is recorded, the servo is disturbed by inconsistent frame pulse. In such cases, turn the Frame Servo Switch OFF.

- Phase Control Circuit

Refer to Fig. 3-46 and 47. Reference V sync from Q8 goes to IC10 pin 25, then via FF2 in the IC, to the trapezoid generator (a, b, c). The drum pulse (i and j) enters pins 23 and 24, where CH-2 and CH-1 playback switching phase is adjusted by MM1 and MM2 (g and h).

The drum pulse via +PG is delayed To sec (f) and applied to gate 2 (e). The gate 2 output pulse samples the ramp voltage of the trapezoid (c), yielding an error voltage at pin 15 (or TP15). This goes as the motor control voltage via switching, opamp and drive circuits to the drum motor.

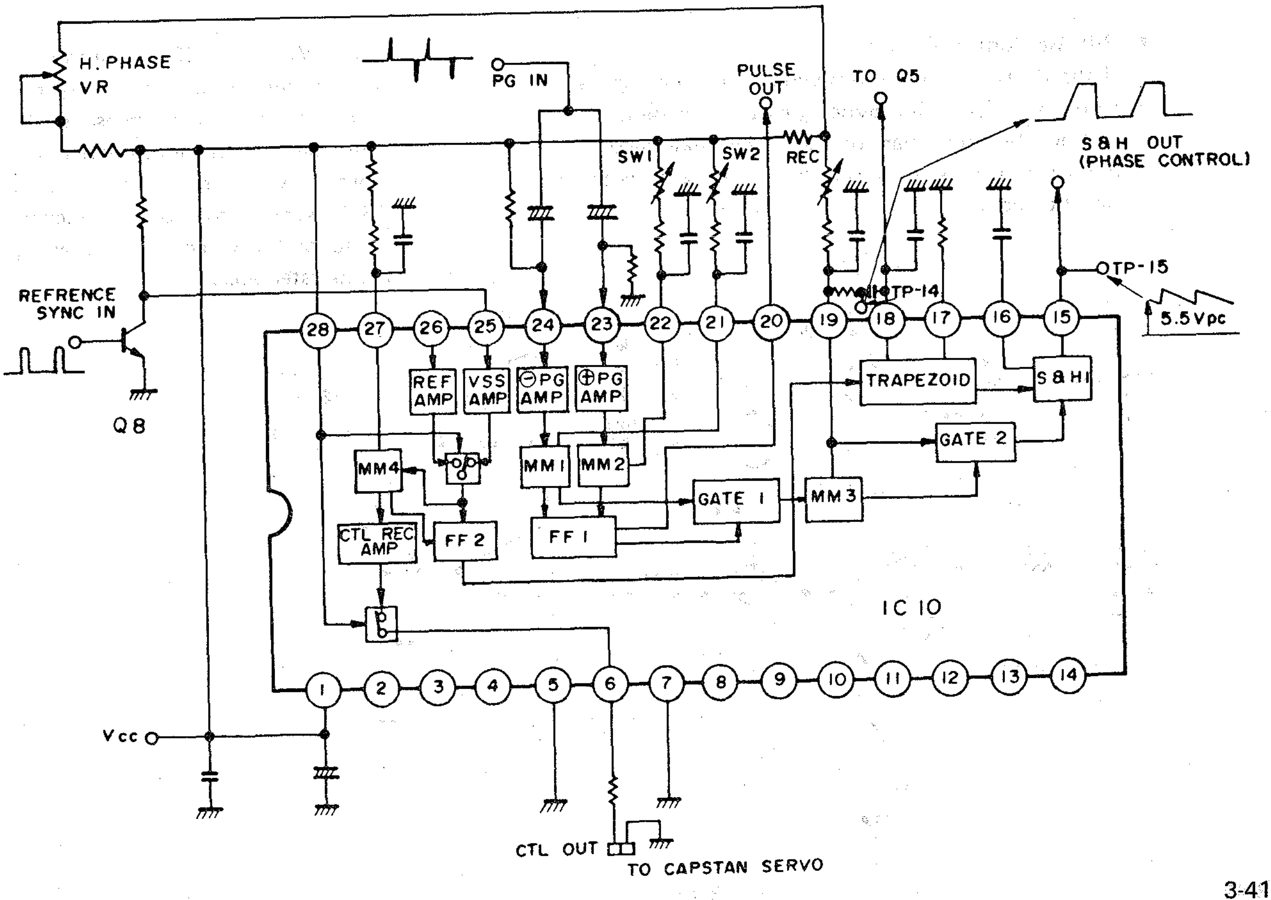

H. PHASE VR
PG IN
PULSE OUT
TO Q5
S & H OUT (PHASE CONTROL)
SW1
SW2
REC
TP-15
TP-14
5.5Vpc
REFRENCE SYNC IN
Q8
28
27
26
25
24
23
22
21
20
19
18
17
16
15
REF AMP
VSS AMP
⊖PG AMP
⊕PG AMP
TRAPEZOID
S & H
GATE 2
MM4
MM1
MM2
GATE 1
MM3
CTL REC AMP
FF 2
FF 1
IC 10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Vcc
CTL OUT
TO CAPSTAN SERVO

Fig. 3-46

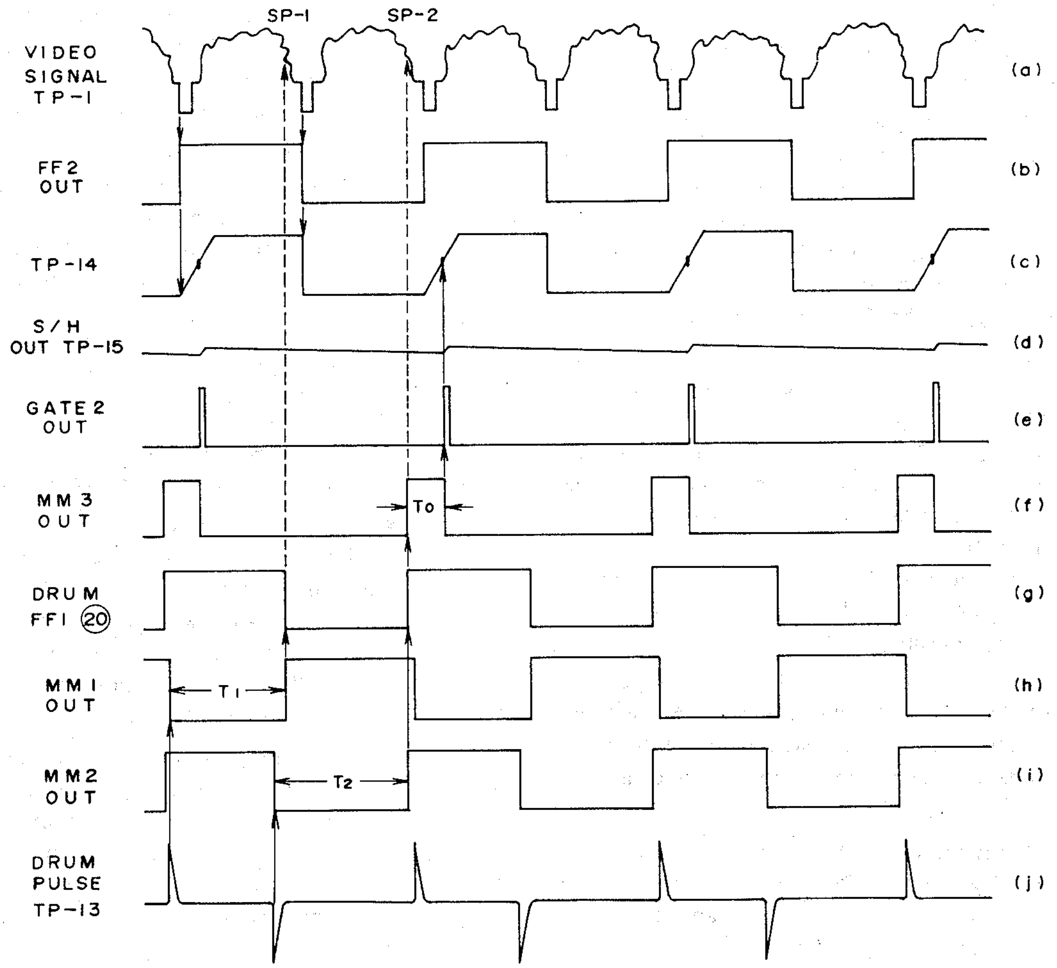

SP-1
SP-2
VIDEO SIGNAL TP-1
(a)
FF2 OUT
(b)
TP-14
(c)
S/H OUT TP-15
(d)
GATE 2 OUT
(e)
MM 3 OUT
To
(f)
DRUM FF1 ⑳
(g)
MM 1 OUT
T1
(h)
MM2 OUT
T2
(i)
DRUM PULSE TP-13
(j)

Fig. 3-47

- H-Phase Control Circuit

  If the PB H sync and the H sync of the new signals to be recorded (EXT Sync) are out of phase when editing, the upper part of the screen may become momentarily distrubed at the edited area when playing back.

The MM3 of the IC10 is a monomulti for setting the sampling pulse phase. By changing the time constant, the To changesand the phase of the drum against the input video changes. In other words, by adjusting the H phase control, the PB H sync phase can be aligned to the H sync phase of the video input, thereby elimating problems listed above.

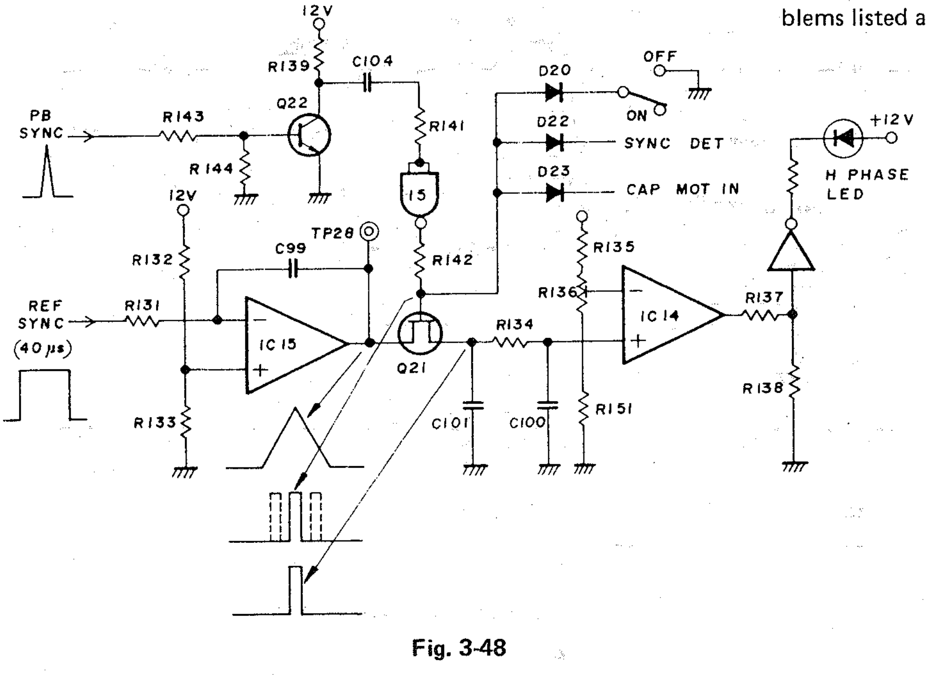

12V
R139
C104
Q22
PB SYNC
R143
R144
12V
R141
15
D20
OFF
ON
D22
SYNC DET
D23
CAP MOT IN
+12V
H PHASE LED
TP28
C99
R132
R142
R135
REF SYNC (40μs)
R131
R136
IC 15
Q21
R134
IC 14
R137
R133
C101
C100
R151
R138

Fig. 3-48

- H PHASE indicator circuit

  When the H phase volume is turned and the PB H sync phase is adjusted to the H sync of the video input, the H phase indicator lights up. Fig. 3-48 illustrates the circuit.

  The input video signal that becomes the setting point enters IC15 and its output enters the Q21 drain as triangle waves.
  On the other hand, the PB H sync enters the Q21 gate after passing through the Q22 amplifier an and the IC15 invertor. If the Q21 gate pulse is close to the peak of the triangle wave of the Q21 drain, the Q21 will turn on the pulse entering the gates and will be amplified by IC14.

- SERVO-LOCK Indicator circuit

  The IC13 is a window comparator, and when the voltage exceeds a certain range, the pin 1 will be L, or if it becomes lower, the pin 7 will become L. In either case, the output will be L due to the IC13 being an open collector. Therefore the IC13 output will become L and the servo lock indicator will turn off when the phase error voltage of the servo exceeds the given range.

- Discriminator circuit

  Refer to Fig. 3-49 and 50. The FG pulse (a) from the drum motor enters IC10 pin 14. From there it goes via the FG amplifier and FF3 to MM5 and two inverters (b). The outputs of FF3 and MM5 go to gate 3 to produce pulse (d).

  A trapezoidal waveform (f) is produced with a risetime equivalent to this pulse width. The outputs of gate 3 and MM5 enter gate 4 to yield sampling pulse (g). This is used for sampling trapezoid 2 at sample/hold 2, which holds the trapezoid peak (h) voltage (ramp stops with gate 4 output rise).

  If for some reason, the motor rotation becomes delayed, the pulse width at FF3 output increases. By gating this with the fixed high output of MM5, the pulse width (t) becomes narrower. Since TR22 ramp angle and gate 4 low component length T are fixed, the variation of (t) becomes the trapezoid peak voltage (sampling voltage) variation. Consequently, as (t) becomes narrower, the trapezoid voltage (i.e., final DC output) becomes lower. This is applied to the invert input of opamp IC11, increasing the opamp output. The motor speed increases, there by functioning to maintain a fixed speed. The phase control output is applied to the plus side of IC11 opamp.

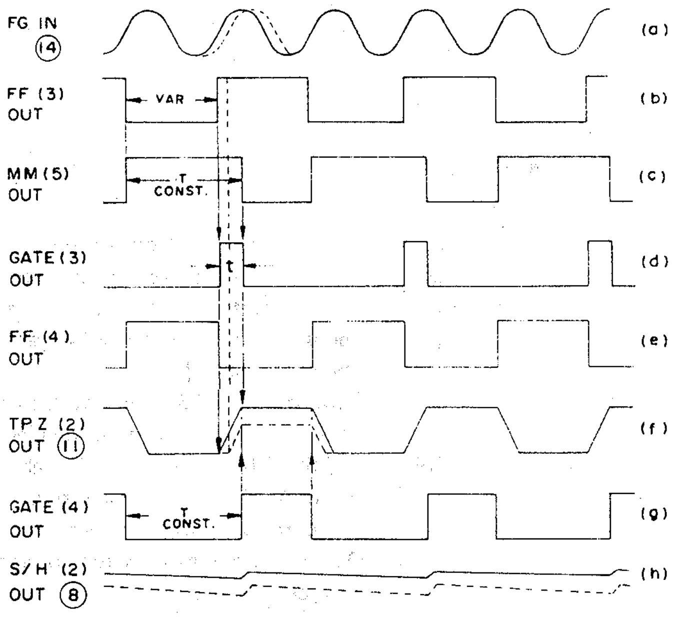

FG IN ⑭
FF (3) OUT
VAR
MM (5) OUT
T CONST.
GATE (3) OUT
t
FF (4) OUT
TPZ (2) OUT ⑪
GATE (4) OUT
T CONST.
S/H (2) OUT ⑧
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)

Fig. 3-50

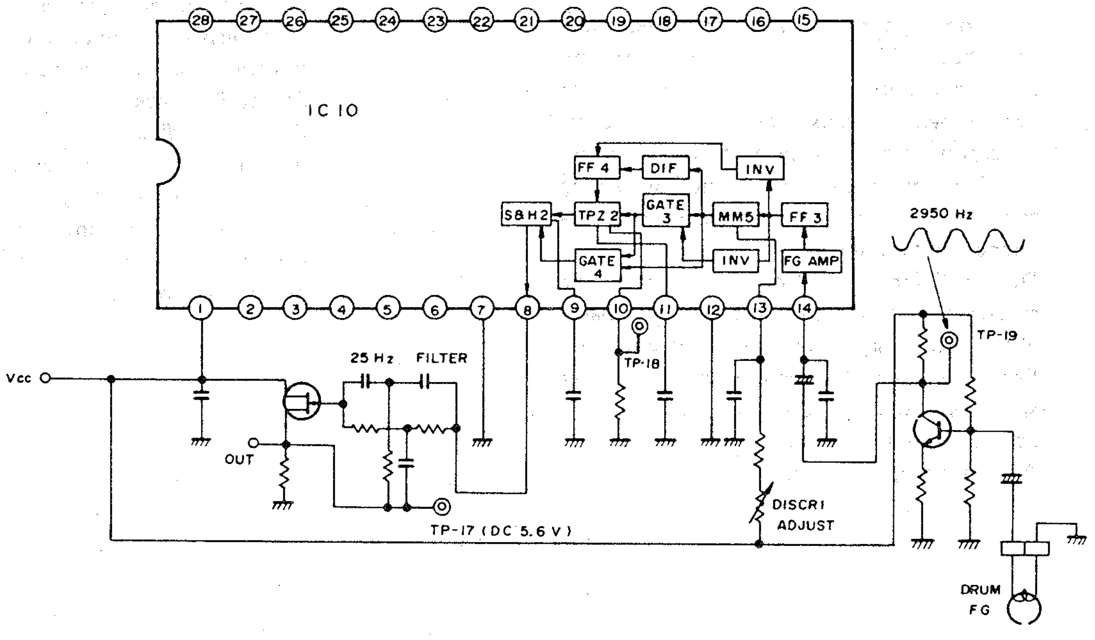

IC 10
28 27 26 25 24 23 22 21 20 19 18 17 16 15
1 2 3 4 5 6 7 8 9 10 11 12 13 14
FF 4
DIF
INV
S&H2
TPZ 2
GATE 3
MM5
FF 3
GATE 4
INV
FG AMP
Vcc
OUT
25 Hz FILTER
TP-17 (DC 5.6 V)
TP-18
DISCRI ADJUST
2950 Hz
TP-19
DRUM FG

Fig. 3-49

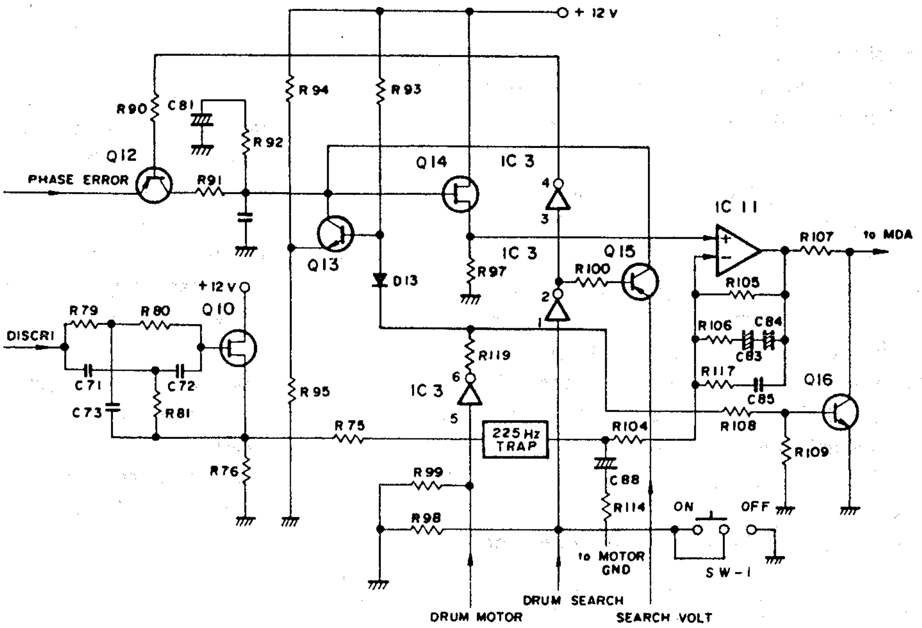

+ 12 V
R90
C81
R94
R93
R92
Q12
PHASE ERROR
R91
Q14
IC 3
4
3
IC 11
R107
to MDA
Q13
IC 3
Q15
R100
R97
D13
+12V
R105
R79
R80
Q10
DISCRI
2
1
R106
C84
C83
R119
R117
Q16
C71
C72
R95
IC 3
6
5
C85
C73
R81
R75
225 Hz TRAP
R104
R108
R109
R76
R99
C88
R114
ON
OFF
R98
to MOTOR GND
SW-1
DRUM SEARCH
DRUM MOTOR
SEARCH VOLT

Fig. 3-51

- Other circuits
  Refer to Fig. 3-51.

Q13: 0.4 sec after the Play button is pressed, high command goes to IC3 pin 5 (drum motor in) through D13, cutting off Q13. The error voltage goes from Q12 to Z14 gate to control the motor speed.
In the Stop mode, Q13 is on and Q14 gate is held at synchronizing voltage divided by R94 and R95. Therefore, even though Q13 is cutoff during Play, since C81 holds this voltage, synchronizing speed is high. In other words, Q13 functions as a switch for speeding up the lock in time.

X15: Normally, fixed drum speed is maintained. However, during the Search mode, the forward and reverse tape speeds introduce variations in the playback signal frequency, i.e., about 15% higher in the Forward 15x speed and about 17% lower in the Reverse 15x speed. Because of this, horizontal synchronization may be lost in a TV monitor. This problem can be avoided by varying the drum speed in accordance with the changes in tape speed.
During Search, high command from the syscon circuit (via the capstan servo board) enters IC3 pin 1 and switches Q15 on. Search voltage for controlling the drum speed is supplied from the drum servo in accordance with the tape speed.
At this time, the drum search in command cuts off Q12 via IC13 pins 1, 2, 3 and 4, opening the phase control loop.
However, when a time base corrector is used, vertical synchronization of a connected TV monitor may be impaired. Therefore, turn the switch SW1 to stop the drum speed correction.

Q16: In absence of the drum motor in command, IC3 pin 5 is low and Q16 on. The motor drive output ceases and the motor stops.

Twin T filter: This filter is composed of C71 to C73 and R79 to R81. The 25 Hz component is attenuated in order to remove distortion arising from rotational irregularities.
The 225 Hz trap also removes 225 Hz jitter.

IC11 feedback: The CR circuit between IC11 input and output applies negative feedback with respect to relatively fast fluctuations in order to avoid hunting when shifting from Still to Playback.
Current feedback resistor R113 is inserted between the motor ground and chassis ground. The resulting voltage is used for feedback to the minus side of the opamp, suppressing motor current ripple and minimizing rotational error.

3.6.3 Capstan servo system

The trapezoidal waveform from the drum servo is also supplied to this circuit. During playback, its phase is compared with that of the control signal picked up by the CTL head to control capstan motor rotation.
Since the playback control signal is not available during recording, in place of the CTL signal, the 450 Hz output of the capstan FG is counted down 1/18th to 25 Hz. This then compared with the trapezoid from the drum servo.

A) Control signal
Initial amplification of the low level playback CTL signal takes place in IC5. The signal is further amplified by a 2 stage opamp and becomes a squarewave via monostable IC3. Fig. 3-52 illustrates this process.

B) Phase control circuit (see Fig. 3-53 and timing chart, Fig. 3-54).

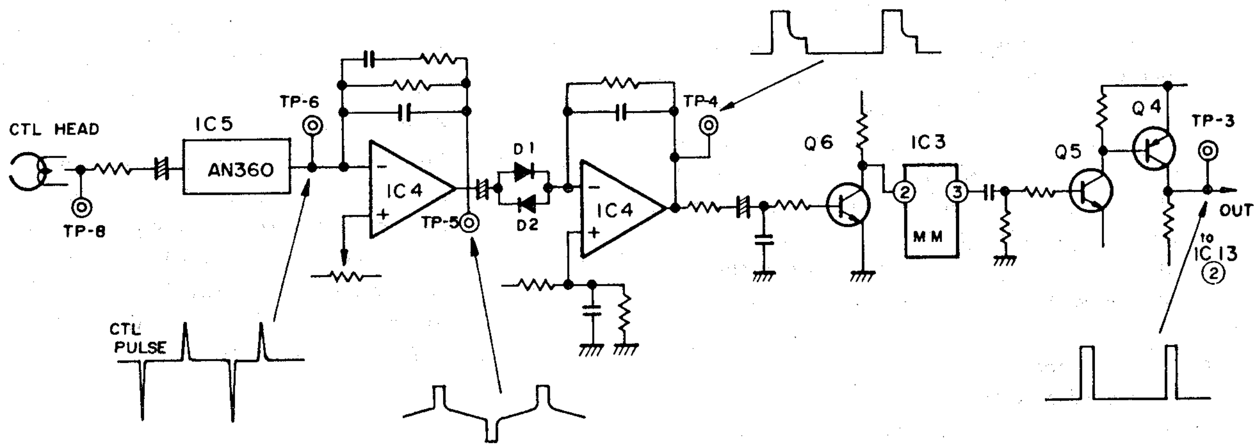

CTL HEAD
TP-8
IC5
AN360
TP-6
IC4
TP-5
D1
D2
IC4
TP-4
Q6
IC3
MM
Q5
Q4
TP-3
OUT
to IC13 ②
CTL PULSE

Fig. 3-52

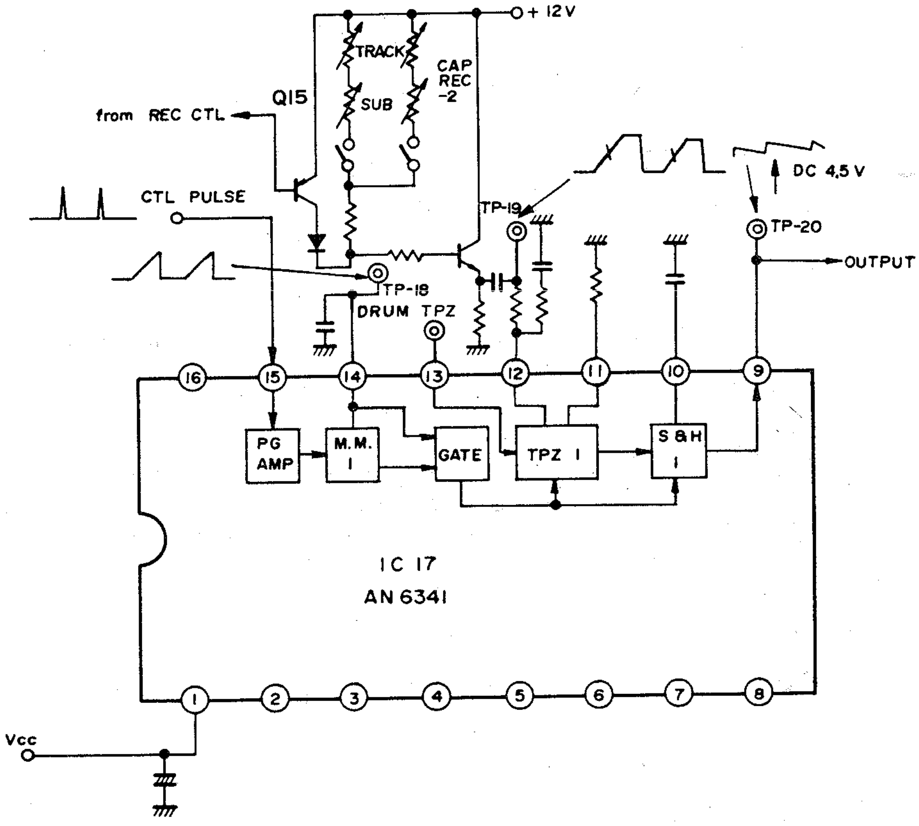

+ 12V
TRACK
SUB
CAP REC -2
from REC CTL
Q15
CTL PULSE
TP-19
DC 4.5 V
TP-20
OUTPUT
TP-18
DRUM TPZ
16
15
14
13
12
11
10
9
PG AMP
M.M. I
GATE
TPZ I
S&H I
IC 17
AN 6341
1
2
3
4
5
6
7
8
Vcc

Fig. 3-53

- Playback mode

The reference signal is trapezoid waveform (g) produced by IC17 when triggered by the falling component of trapezoid (i) obtained from either the input video or the internal SSG through the drum servo circuit.

The comparison signal is the CTL signal recorded on the tape. This is applied to IC13 pin 2 via IC5, 4 and 3, and transistors Q6, Q5 and Q4. Diodes D1 and D2 are for slicing the noise component. Also, 20 msec gating and waveform shaping are performed in order to avoid the effects of noise in the 25 Hz period of IC3 monostable.

IC13 pin 1 high during playback and pin 9 is high during recording. The CTL signal is obtained from pin 3 during playback. This goes to IC17 and triggers monostable (f); width of the monostable can be varied by the TRACKING control. The monostable fall component samples the trapezoid ramp (b) and the resulting error voltage (h) goes to the non-inverting input of the differential amplifier.

- Recording mode

Like when playing, the reference signal is a trapezoidal waveform made by the drum servo. FG signals that have been counted down to 25 Hz from 450 Hz by the counter circuit are used as comparison signal instead of CTL pulse.
The width of the 25 Hz signal is controlled by the MMV of IC6 (C), and falling edge of the 25 Hz signal triggers the MMV inside the IC17.
When REC, this MMV width is fixed (right half of f) due to Q15 being ON and samples the trapezoidal waveform with the falling edge. To sample the same fixed position even when switched from PLAY to REC, the MMV width is adjusted with the R98 (Capstan REC phase-1).
When REC Pause is returned to the REC mode, there is 2.4 seconds of playing time. Because the REC mode command is still in effect during this period, this will short pins 3 and 4 of the IC20 switch.

Threfore wven if the external tracking VR is not at the preset position, because the R165 capstan REC phase-2 is set at the same position by means of the external tracking VR, the control pulses will be recorded in equal distance at the junction when switched from PB to REC – eliminating the effects of tracking VR.

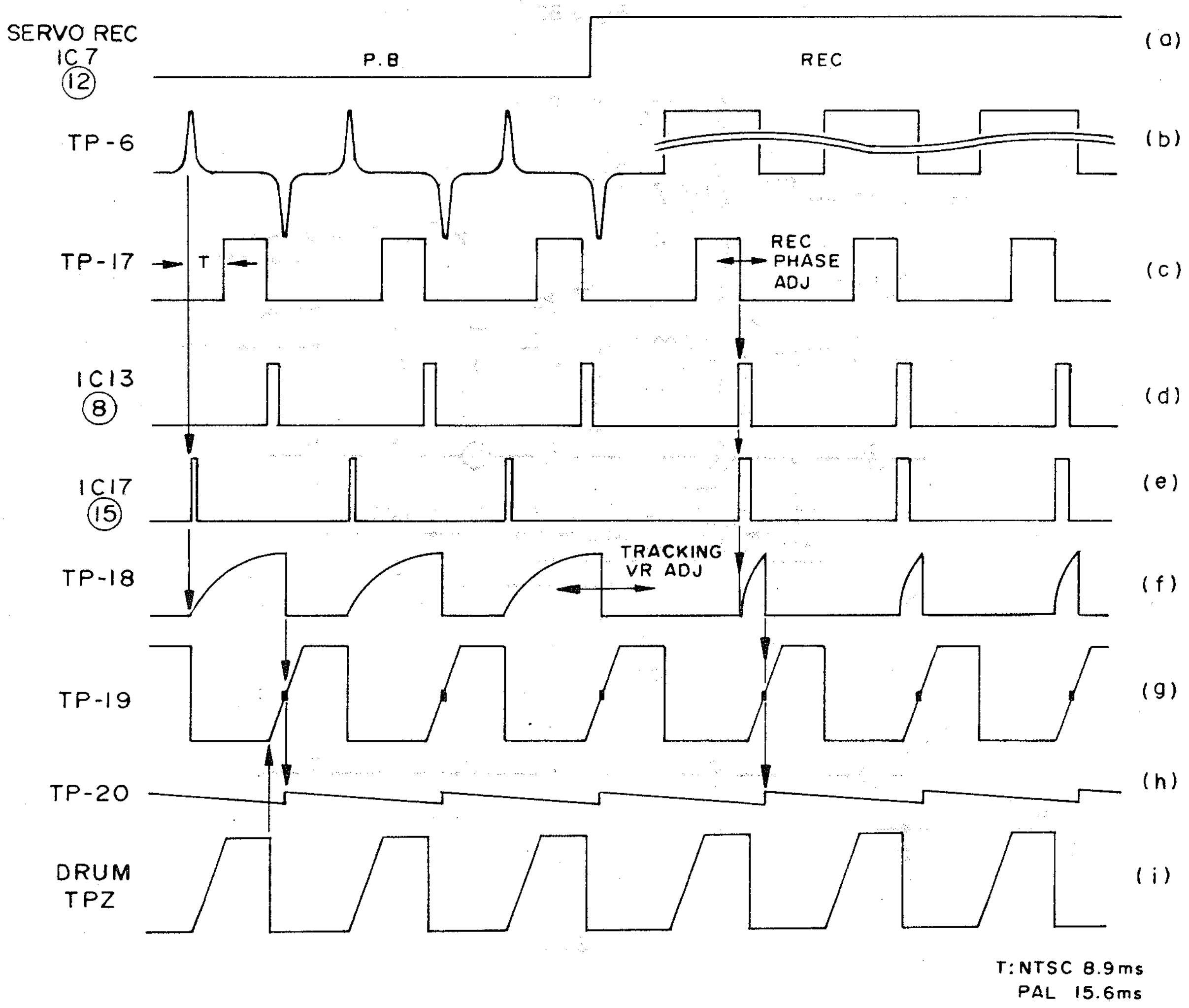


Fig. 3-54

- SERVO LOCK Indicator circuit
  IC21 is a window comparator. The output becomes L when the capstan servo phase's error voltage deviates from its given range. This will enter the IC15 pin 6 of the drum servo circuit and turn off the servo lock indicator.

- REC control switch
  High at SERVO REC resets the first flipflop and sets "Q" to low. This "Q" goes to "R" of the next FF, but since "J" is high, and "K" and "S" are low, when the next "C" input is high, "Q" (IC7 pin 1) becomes high. See Fig. 3-55, 56 and table 3-11.

CLOCK	J	K	S	R	Qn+1	$\overline{Qn+1}$
↑	L	L	L	L	Qn	$\overline{Qn}$
↑	H	L	L	L	H	L
↑	L	H	L	L	L	H
↑	H	H	L	L	$\overline{Qn}$	Qn
↓	×	×	L	L	Qn	$\overline{Qn}$
×	×	×	H	L	H	L
×	×	×	L	H	L	H
×	×	×	H	H	L	L

×: Don't Care

Table 3-11

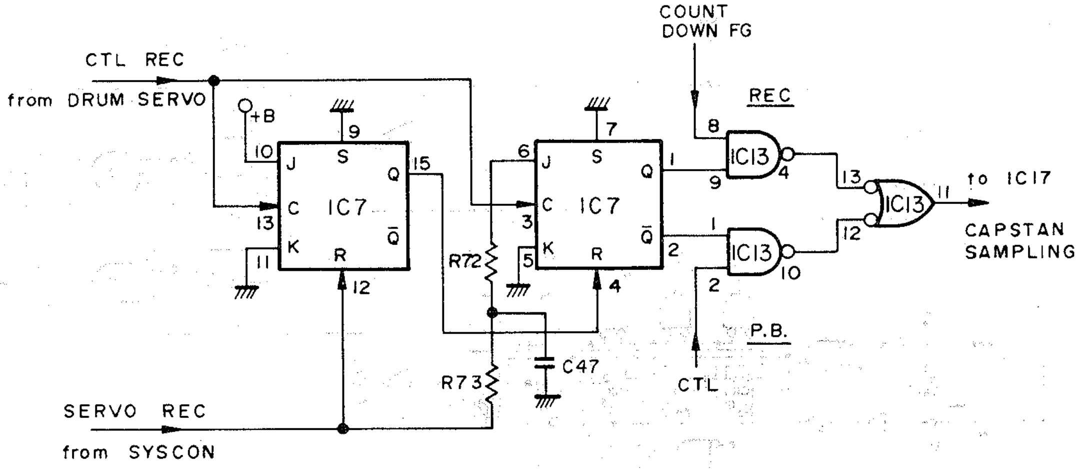

COUNT DOWN FG
CTL REC
from DRUM SERVO
+B
10
9
J
S
Q
15
C
IC7
13
K
R
Q̄
11
12
6
7
J
S
Q
1
C
IC7
3
K
R
Q̄
2
5
4
R72
R73
C47
REC
8
IC13
9
4
13
IC13
11
12
1
IC13
2
10
P.B.
CTL
to IC17
CAPSTAN SAMPLING
SERVO REC
from SYSCON

Fig. 3-55

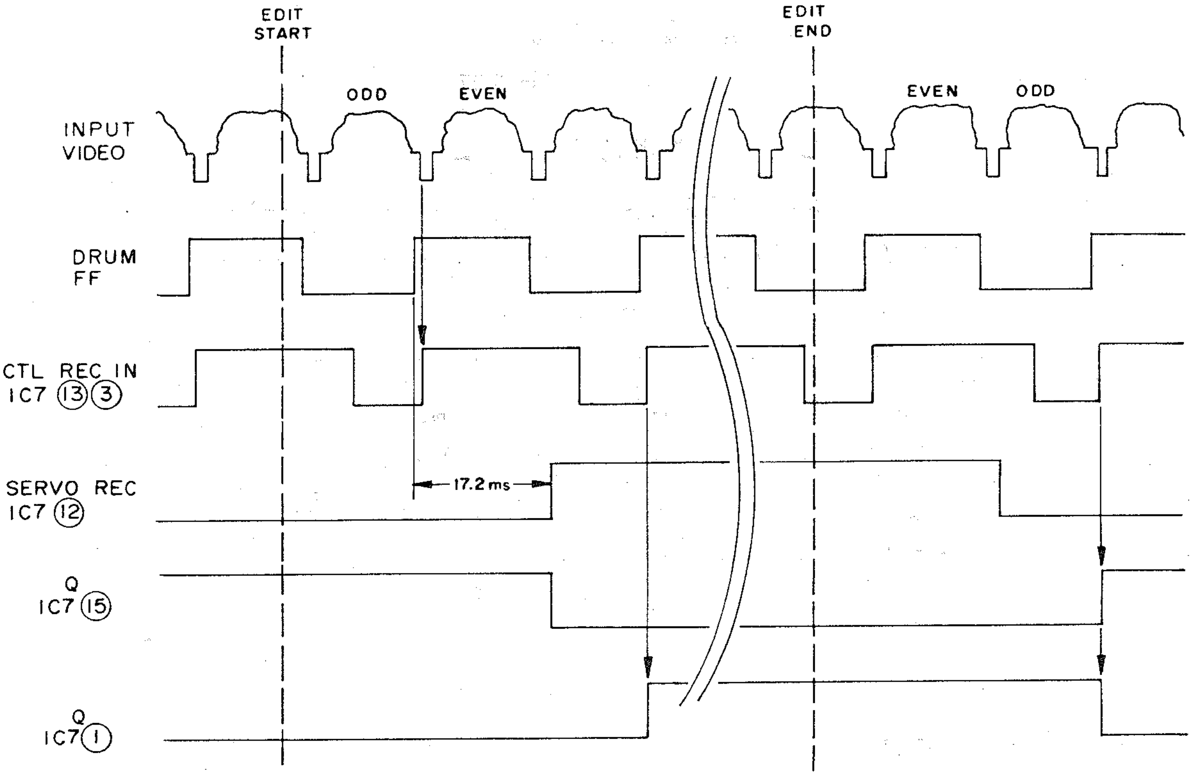

EDIT START
EDIT END
ODD
EVEN
EVEN
ODD
INPUT VIDEO
DRUM FF
CTL REC IN IC7 ⑬③
SERVO REC IC7 ⑫
17.2 ms
Q IC7 ⑮
Q IC7 ①

Fig. 3-56

- FG countdown circuit

During recording, the 450 Hz capstan FG pulse (a) is applied to this circuit in place of the CTL pulse via IC12 from TP10. The 450 Hz is counted down 1/18th. See Fig. 3-57.

IC14 is a base 10 counter and with each input pulse, high appears at outputs corresponding to 0 to 9. Count starts from 0 and when the 10th pulse is counted, high appears at IC14 pin 11 ("Q9"). (b)

This high pulse sets the R-S flipflop of IC15, which does not reset until a low pulse is applied to IC15 pin 8. At a further count of 0 to 4, IC14 pin 10 Q4 (d) goes high and a low pulse (e) appears at IC13 pin 3.

In the editing process when shifting from playback to recording, the counter 0 reset timing during preroll is important in order to record the CTL pulse at the proper timing. For this reason, the control is reset by the x2 speed command of IC13 pin 6 at preroll start.

The low pulse from IC15 pin 3 is delayed slightly and inverted, then used to reset the R-S flipflop and counter. 1/18th frequency division and timing chart are shown in Fig. 3-58. The resulting 25 Hz pulse and the trapezoid from the drum servo are compared in phase at IC17.

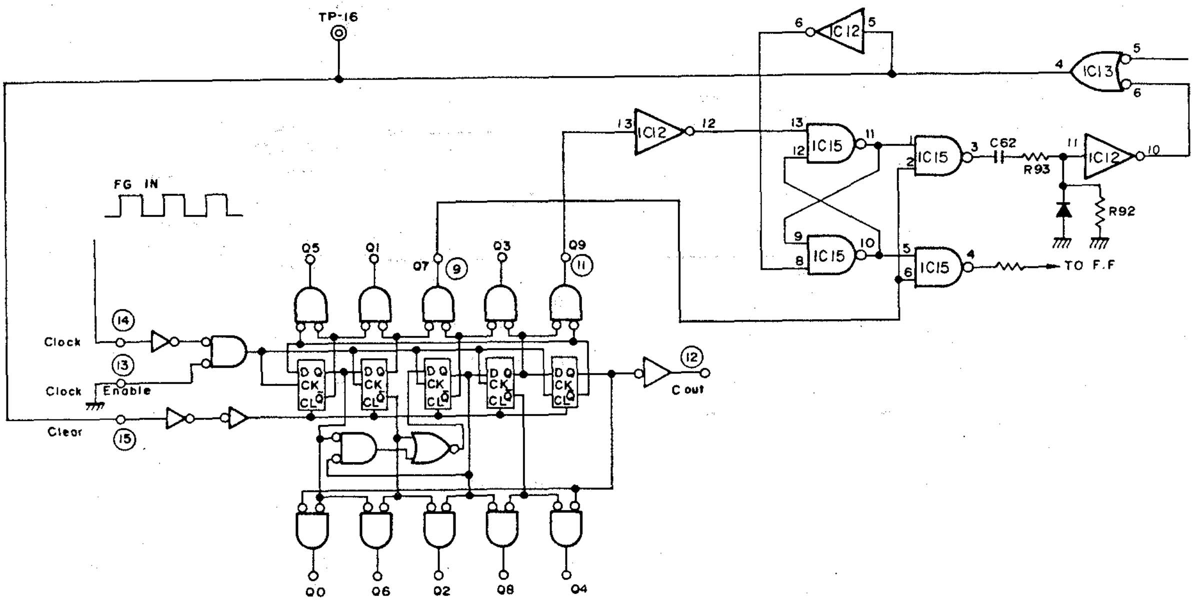

TP-16
IC12
IC13
IC15
C62
R93
R92
TO F.F
FG IN
Q5
Q1
Q7
Q3
Q9
Clock
Clock Enable
Clear
C out
Q0
Q6
Q2
Q8
Q4

Fig. 3-57

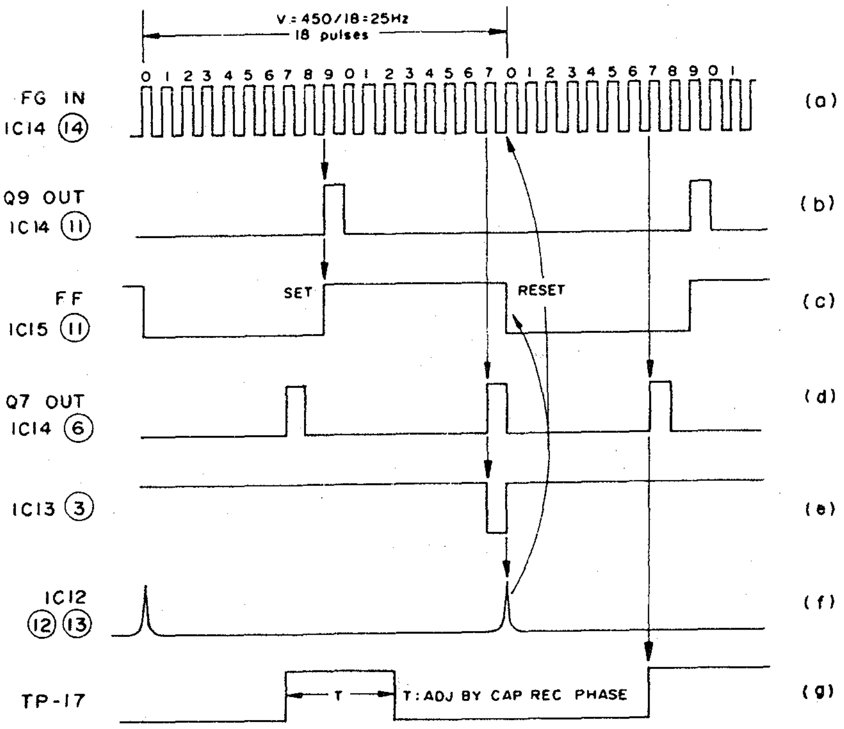

V = 450/18 = 25Hz
18 pulses
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 8 9 0 1
FG IN
IC14 ⑭
Q9 OUT
IC14 ⑪
FF
IC15 ⑪
SET
RESET
Q7 OUT
IC14 ⑥
IC13 ③
IC12
⑫⑬
TP-17
T
T: ADJ BY CAP REC PHASE
(a)
(b)
(c)
(d)
(e)
(f)
(g)

Fig. 3-58

- Discriminator control circuit

Operating principle is the same as the drum discriminator except for the x2 mode, which is outlined below. Refer to Fig. 3-59.

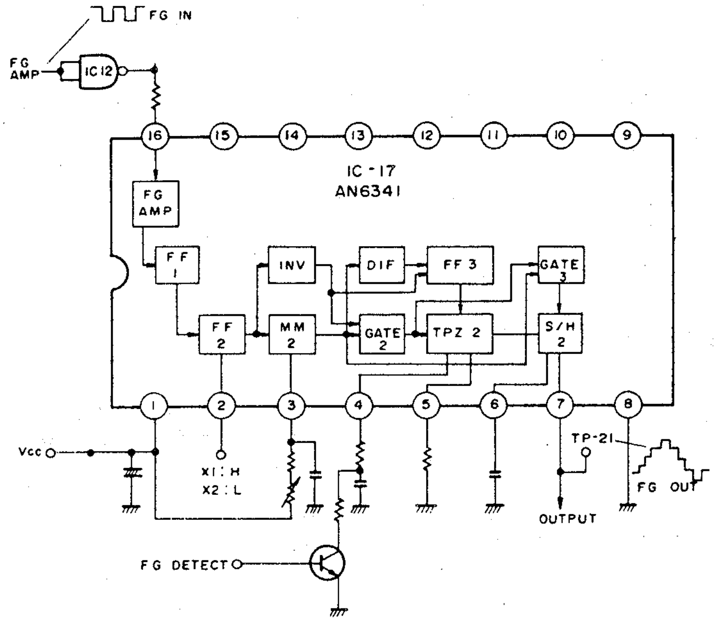
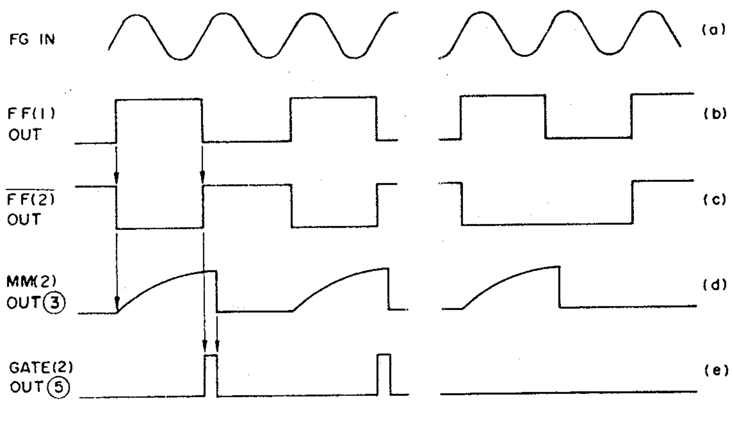

FG IN
FG AMP
IC12
IC-17
AN6341
FG AMP
FF 1
FF 2
INV
MM 2
DIF
FF 3
GATE 2
TPZ 2
GATE 3
S/H 2
16
15
14
13
12
11
10
9
1
2
3
4
5
6
7
8
Vcc
X1 : H
X2 : L
TP-21
FG OUT
OUTPUT
FG DETECT

Fig. 3-59

During normal speed, by setting IC17 pin 2 high, flipflop FF1 output (b) passes freely through FF2 and is gated with MM2 output (d) (Fig. 3-60-A). When setting to the x2 speed, IC12 pin 2 becomes low (Fig. 3-60-B). FF2 functions and output (c) is gated with MM2 output (d). However, since the speed has not yet changed, the gate output is not obtained due to the phase relationship between (c & d).

Consequently, output (i) of S/H 2 declines and this is applied to the invert input of IC19 opamp. The output of IC19 increases and the motor rotation increases. As the speed mode rate is approached, the FF2 output (c) approaches that of FF1 (b) and again gating is performed. As a result, stability becomes reached just as the speed mode is obtained.


FG IN
FF(1) OUT
$\overline{\text{FF(2)}}$ OUT
MM(2) OUT ③
GATE(2) OUT ⑤
(a)
(b)
(c)
(d)
(e)

(A) NORMAL

(B) NORMAL → X2

Fig. 3-60

The operations occur within a very short time and waveforms shown in Fig. 3-61 appear within 1 second after the Q2 command input.

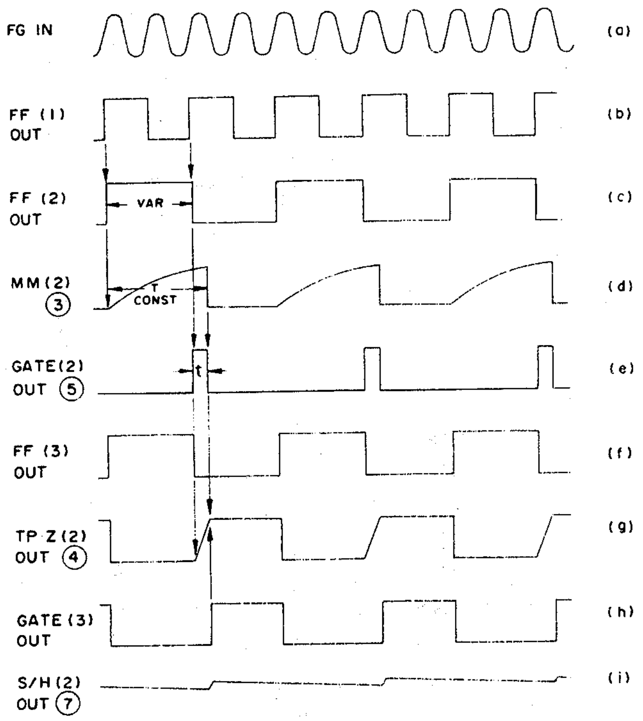
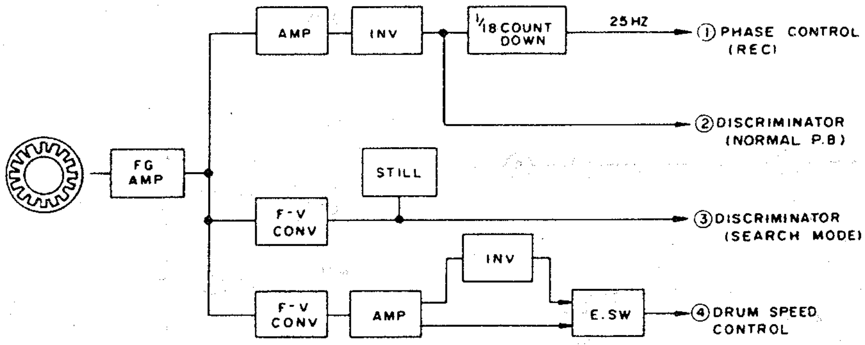

FG IN
FF (1) OUT
FF (2) OUT
VAR
MM (2) ③
T CONST
GATE(2) OUT ⑤
t
FF (3) OUT
TP Z (2) OUT ④
GATE (3) OUT
S/H (2) OUT ⑦
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)

Fig. 3-61

- FG peripheral circuits

The capstan FG pulse is amplified and distributed into four lines indicated in Fig. 3-62.



AMP
INV
1/18 COUNT DOWN
25 HZ
① PHASE CONTROL (REC)
② DISCRIMINATOR (NORMAL P.B)
FG AMP
STILL
F-V CONV
③ DISCRIMINATOR (SEARCH MODE)
INV
F-V CONV
AMP
E.SW
④ DRUM SPEED CONTROL

Fig. 3-62

(1) Phase control:

At the counter, the 450 Hz FG pulse is counted down to 25 Hz. in the phase control circuit, this is used in place of the CTL pulse as the comparison signal for recording (described earlier).

(2) Discriminator (normal P.B.):

Function is described earlier.

(3) Discriminator (search mode):

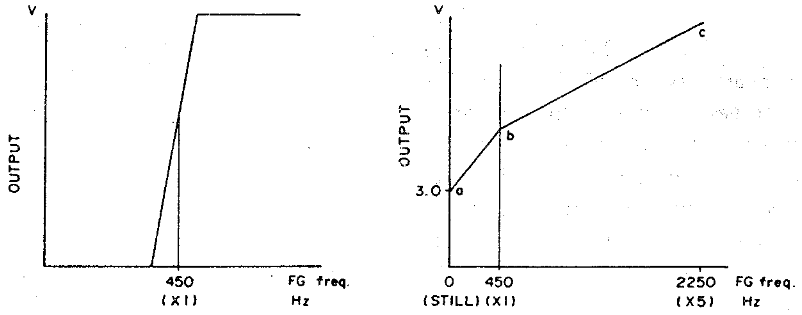
When the tape speed is varied by the remote control unit, at a certain speed, the IC11 F-V converter (see outline of operating principle in Reel Servo description) converts the FG pulse frequency into a DC voltage. At that point, feedback is applied in order to obtain stable tape speed.

Highly stable tape speed is required during the normal mode. Therefore, as shown in Fig. 3-63 (A), servo loop sensitivity is high only at one point of the 450 Hz FG frequency.

During search operation, as shown by (B), sensitivity is reduced at high speeds in order to avoid problems such as hunting, and raised at lower speeds to increase stability.

In Fig. 3-64, R89 adjusts Q12 to obtain a fixed DC voltage from its emitter. This goes to collector of Q11 and determines the voltage during Still. During Slow, the F-V voltage from IC11 pin 3 output declines, and with Q11 cutoff, the range a-b has a slope determined by R82.

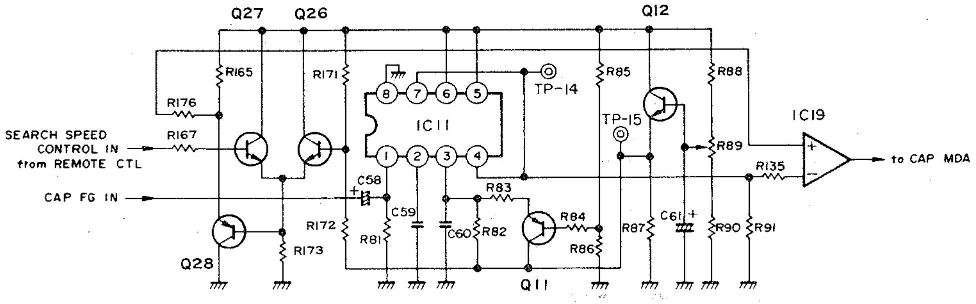
When the normal speed is exceeded, X11 switches on and a gentler slope, b-c, is determined by the parallel resistors R82 and R83.



NORMAL SPEED
(A)

SEARCH MODE
(B)

Fig. 3-63



Q27
Q26
Q12
R165
R171
R85
R88
R176
TP-14
TP-15
IC11
IC19
SEARCH SPEED CONTROL IN from REMOTE CTL
R167
R89
R135
to CAP MDA
CAP FG IN
C58
R83
C59
R172
R81
C60
R82
R84
R87
C61
R90
R91
R173
R86
Q28
Q11

Fig. 3-64

At extremely low tape speeds when using the remote control unit for the Search mode, in order to avoid unstable motor rotation, the circuit of Q26 to Q28 functions to inhibit selection of speeds below a certain point (about 1/30th normal). Since Q26 base voltage is fixed, when the control voltage from the remote control unit declines to a very low value, Q26 and Q27 emitter voltage decreases and Q28 switches on. This produces a voltage drop at R165, which is sent via R176 to the non-invert input of IC19 opamp, setting the opamp output to zero.

(4) Drum speed control:

This circuit functions to vary the drum rotating speed according to the tape speed in the Search mode. The F-V converter of IC1 produces a DC output proportional to the tape speed, independently of the tape running direction This is shown by b-e-b' in Fig. 3-65.

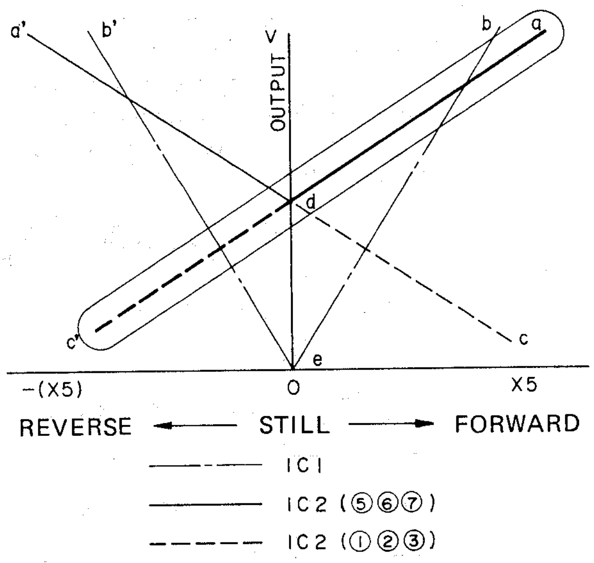


Fig. 3-65

The voltage goes to the non-invert input of IC2 pin 5 (a-d-a'). This is applied to the next stage invert input of IC2 pin 2 and the pin 1 output response becomes as indicated by c-d-c'.

Consequently, when the tape moves in the forward direction, bias voltage proportional to the FG frequency is applied to Q1 and Q2 base. Forward bias increases Q2 emitter voltage, cutting off Q1. Output a-d is produced at TP2.

In the reverse mode, the high command from syscon switches Q3 on, and this switches Q2 off. Consequently, the Q1 output (d-c') at TP2 becomes inversely proportional to the tape speed. In other words, the drum is speeded up in the forward mode and delayed in the reverse mode in order to obtain a fixed playback horizontal frequency.

- Other circuits
  Refer to schematic diagrams.

- Q9 & Q19:
  If for some reason the FG signal stops, in order to avoid damage to the tape, Q9 switches off and Q19 on. Q19 grounds IC17 pin 4 through R131 and R132, preventing abnormally high motor rotation.

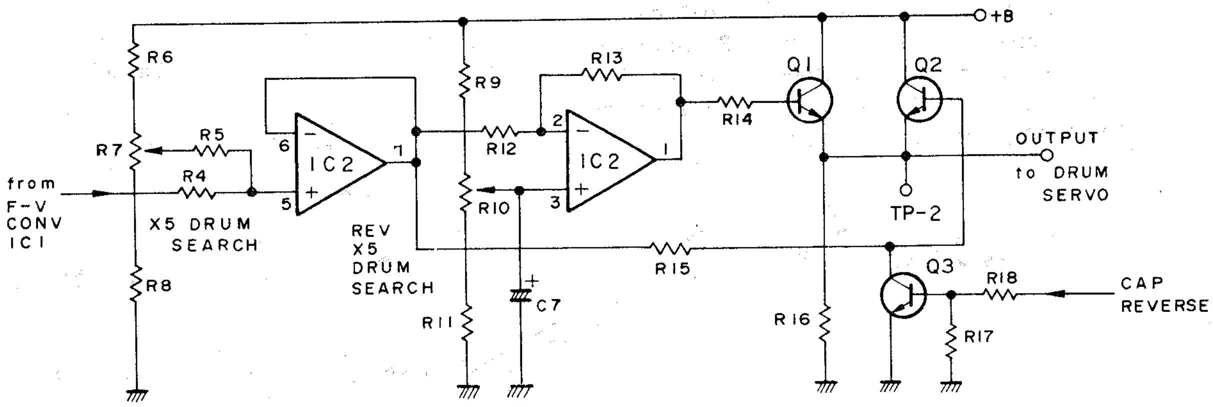


Fig. 3-66

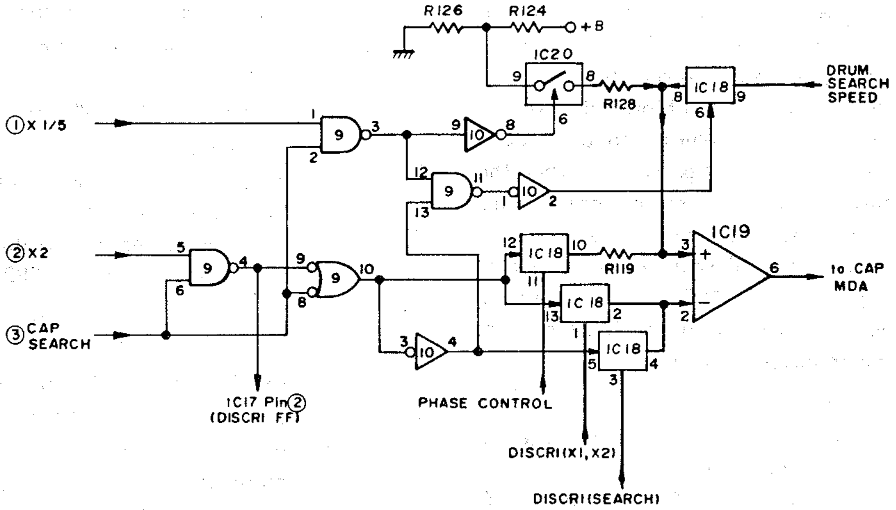

R126
R124
+B
IC20
9
8
6
R128
IC18
8
9
6
DRUM SEARCH SPEED
①X 1/5
1
2
9
3
9
10
8
12
9
11
13
10
1
2
②X2
5
9
4
6
9
9
10
8
12
IC18
10
11
R119
IC18
13
2
3
2
IC19
+
−
6
to CAP MDA
③CAP SEARCH
3
10
4
1
IC18
5
4
3
IC17 Pin② (DISCRI FF)
PHASE CONTROL
DISCRI(X1, X2)
DISCRI(SEARCH)

Fig. 3-67

- Speed control switches

  The switches shown in Fig. 3-67 control DC voltage for regulating tape speed according to mode.

Bilateral switches A to D conduct with high gate potential, routing the phase control or discriminator outputs to the opamp. These modes are indicated in the following Table.

Switch IC20 (pins 6, 8, 9) is on only in the x1/5 mode, during which R124 and R126 set the voltage to control the tape speed.

In the x2 mode, low from IC9 pin 4 goes to IC17 pin 2. Although the FG frequency doubles during the x2 mode, the output of FF2 in IC17 remains the same frequency as during the normal mode (described earlier with reference to Fig. 3-59).

IC10 pin 5 is high in the normal mode, cutting off Q20, Q21 and Q25 shown in Fig. 3-68. Conversely, in the Still mode, pin 5 is low and these transistors are on. At this time, Q25 collector is high and all the coil switching transistors of the motor are on, applying brake. Also Q21 is on and the MDA input is zero.

Because of the input parameters, IC19 outputs are saturated at high, fully charging C79 and C80. When shifting from Still to Slow search, in order to prevent this discharge from causing the motor to overrun, Q20 is on during Still, providing bias so that the non-invert input voltage does not saturate IC19.

			Sw. A	Sw. B	Sw. C	Sw. D	X18	IC17 2
X 1/5	①	H	OFF	ON	OFF	OFF	ON	H
	②	L						
	③	H						
NORMAL SPEED	①	L	ON	OFF	OFF	ON	OFF	H
	②	L						
	③	L						
X 2	①	L	ON	OFF	OFF	ON	OFF	L
	②	H						
	③	H						
SEARCH MODE	①	L	OFF	ON	ON	OFF	OFF	H
	②	L						
	③	H						

Table 3-12

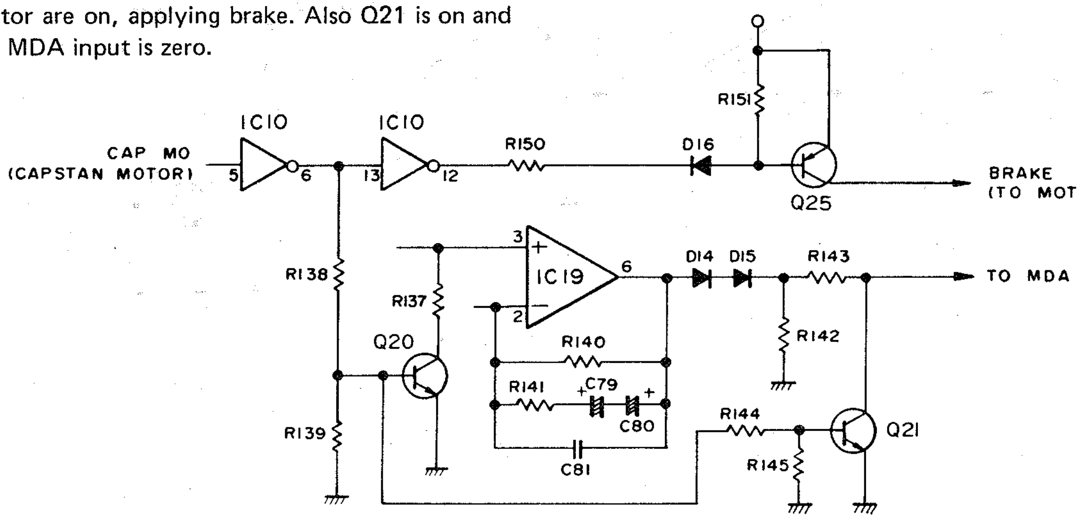

CAP MO (CAPSTAN MOTOR)
IC10
5
6
IC10
13
12
R150
D16
R151
Q25
BRAKE (TO MOTOR)
R138
R137
3
2
+
−
IC19
6
D14
D15
R143
TO MDA
R142
Q20
R140
R141
C79
C80
C81
R139
R144
R145
Q21

Fig. 3-68

3.7 SIGNAL SYSTEM

In comparison to earlier VCRs, the distinguishing features of the signal system in this model are as follows.

1. FM dubbing capability
2. Switchable video bandwidth for color and monochrome
3. New circuit design for color playback

Fig. 3-70 illustrates the basic block diagram of the signal system. In the FM dubbing mode, the head amplifier input is switched from the normal recording amp to the dubbing signal input circuit.

The FM dubbing output is taken from midway in the Y signal processing circuit (after dropout compensation). During playback, the color signal goes through the ACC circuit, then to the FM dubbing output.

During the FM dubbing mode, the E-E input becomes the FM dubbing input, instead of the video input.

3.7.1 Luminance (Y) signal system block diagram

An electronic switch selects the video input for either the 8-pin rectangular connector (TV-monitor) or the BNC connector. IC5 converts the input into an FM signal.

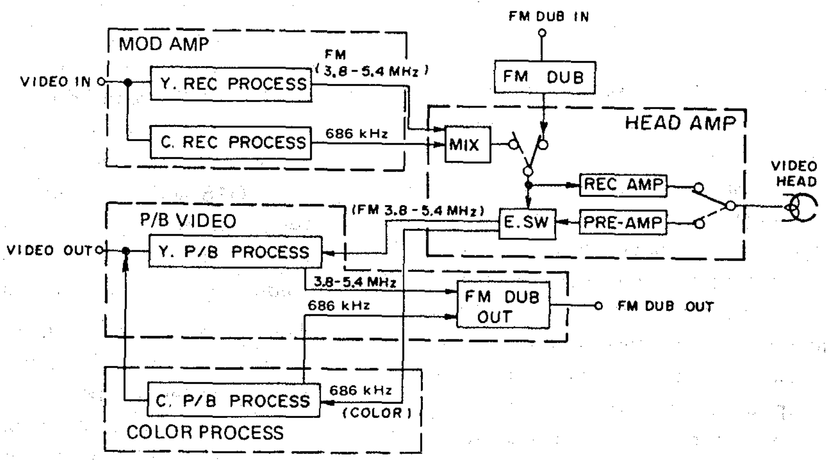

FM DUB IN
MOD AMP
VIDEO IN
Y. REC PROCESS
FM (3.8-5.4 MHz)
FM DUB
C. REC PROCESS
686 kHz
HEAD AMP
MIX
REC AMP
VIDEO HEAD
P/B VIDEO
(FM 3.8-5.4 MHz)
E.SW
PRE-AMP
VIDEO OUT
Y. P/B PROCESS
3.8-5.4 MHz
686 kHz
FM DUB OUT
FM DUB OUT
C. P/B PROCESS
686 kHz (COLOR)
COLOR PROCESS

Fig. 3-69

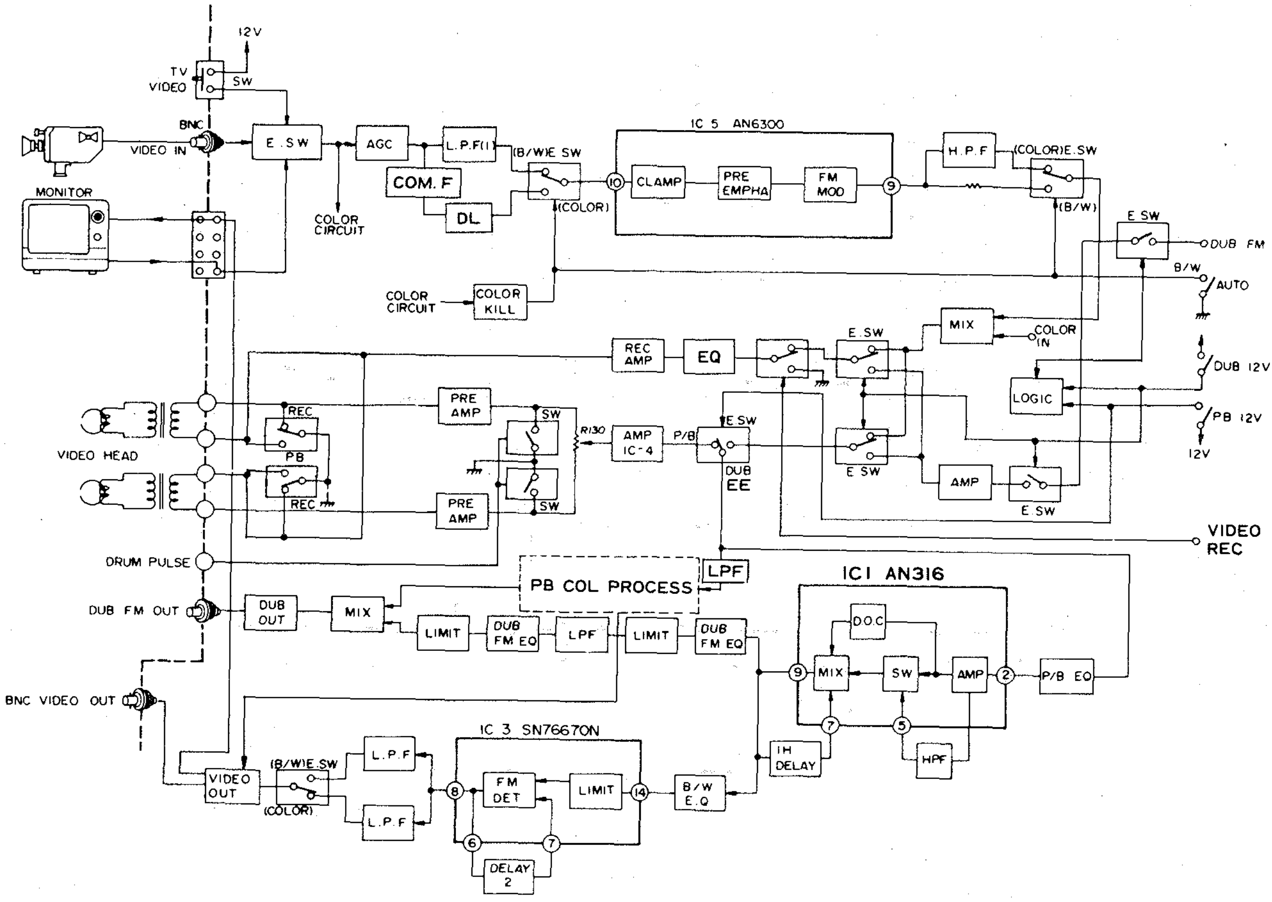

12V
TV VIDEO
SW
BNC
VIDEO IN
E.SW
AGC
L.P.F(1)
(B/W)E SW
COM. F
DL
(COLOR)
COLOR CIRCUIT
MONITOR
IC 5 AN6300
CLAMP
PRE EMPHA
FM MOD
H.P.F
(COLOR)E.SW
(B/W)
E SW
DUB FM IN
B/W
AUTO
COLOR CIRCUIT
COLOR KILL
REC AMP
EQ
E SW
MIX
COLOR IN
DUB 12V
LOGIC
PB 12V
12V
REC
PB
VIDEO HEAD
PRE AMP
SW
R130
AMP IC-4
P/B
E SW
DUB EE
E SW
AMP
E SW
VIDEO REC
DRUM PULSE
LPF
PB COL PROCESS
IC1 AN316
DUB FM OUT
DUB OUT
MIX
LIMIT
DUB FM EQ
LPF
LIMIT
DUB FM EQ
D.O.C
MIX
SW
AMP
P/B EQ
BNC VIDEO OUT
IH DELAY
HPF
IC 3 SN76670N
L.P.F
(B/W)E SW
VIDEO OUT
(COLOR)
L.P.F
FM DET
LIMIT
B/W E.Q
DELAY 2

Fig. 3-70

Two types of signals go through the recording amplifier (REC AMP): 1) the frequency modulated video signal, and 2) the dubbing FM signal.

The playback output from the video heads is also used for two applications: 1) the conventional FM video signal, and 2) FM dubbing signal to other VCRs.

Even the best quality video tape possesses minute pinholes and magnetic particle losses, which cause transient loss or reduction (dropout) of the FM signal. One property of television is that one horizontal scanning line differs only slightly from the preceding line. The dropout compensator uses this principle and when transient signal loss occurs, the circuit automatically inserts the stored signal from the previous horizontal scanning line.

The signal from the dropout compensator is branched in two lines: a) through a limiter circuit, then to external equipment (TV-monitor, etc.) as the FM video signal, and b) after frequency response correction, to other VCRs as the FM dubbing signal.

In IC3, the AM component is removed from the playback FM signal. After limiting, the signal goes to a delay line type FM detector for demodulation. Two filters with different characteristics are inserted between the demodulator and the video signal processor. The signal goes through the appropriate filter according to whether it is color or monochrome, then to the processor and output.

3.7.2 Video signal processing circuit

Video signal processing is carried out mostly in IC5 (AN6300). The video input signal is applied to IC5 pin 1 where the AGC (automatic gain control) circuit stabilizes the level, after which the resulting signal appears at pin 24.

This signal is separated into two. One signal enters the electronic switch and passes through the LPF, the other through the comb-filter. In the B/W mode, it selects the former and in color mode, selects the latter signal.

The comb filter does not pass color signals only, and therefore allows the Y signals within the color signal band to pass through.

With a conventional VCR, Y signals under the color band are handled, not achieving high resolution. With the CR-8250, about 260 lines are obtained.

The signal is then clamped and sent to the pre-emphasis circuit. The dark and white clip circuit, consisting of Q14, Q16 and Q17 and connected to pin 12, clips excessive overshoot in both positive and negative directions due to the pre-emphasis circuit. Finally the signal is frequency modulated and obtained from pin 9.

Theoretically, the frequency modulated video signal includes an unlimited number of sidebands. In order to avoid interference between these and the 686 kHz converted color signal, a highpass filter (HPF) removes the band from the FM video signal in which the color signal is to be inserted. This HPF is not required during monochrome.

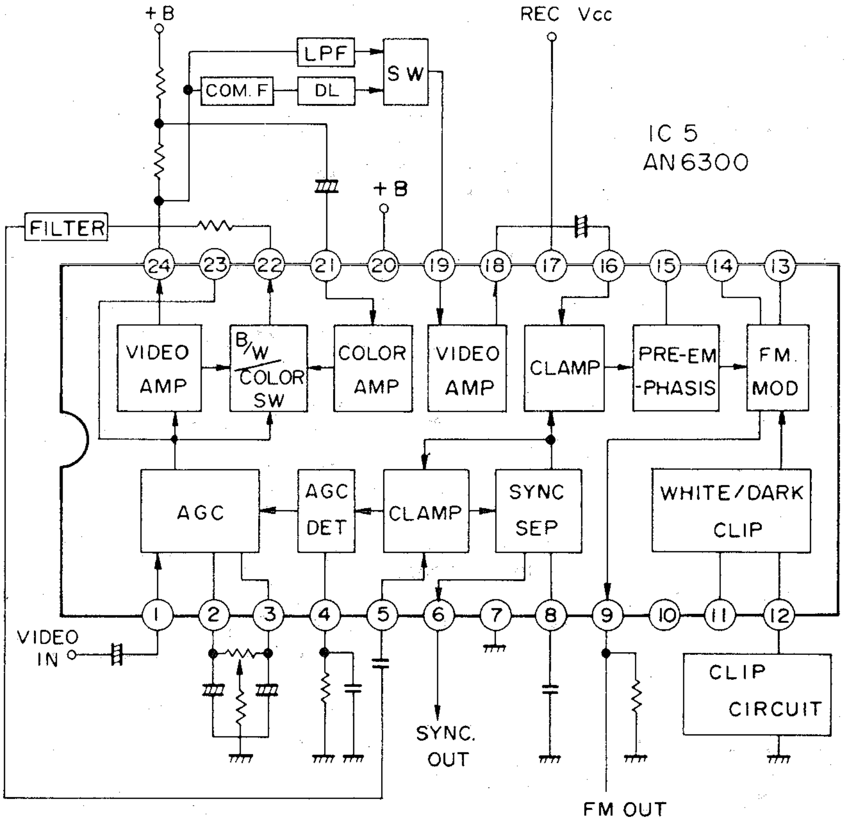


Fig. 3-71

3.7.3 Color signal recording

The selected video input signal appears at TP-11. This signal goes through a bandpass filter which extracts the color component, then to the ACC circuit.

From the ACC circuit, the signal is branched in three directions: 1) to a balanced modulator for mixing with 5.12 MHz to yield the 686 kHz lowband color signal, 2) as control signal for the color killer circuit for discriminating between color and monochrome signals, and 3) feedback to the ACC circuit.

A crystal oscillator produces the 5.12 MHz continuous wave (CW) signal. By applying this signal and the 4.43 MHz color signal to a balanced modulator, sum and difference signals become produced. A lowpass filter removes the 9.6 MHz sum signal and supplies the difference signal to the color killer amplifier.

During dubbing and playback, the color signal from input video is not necessary, rather it may cause some interference. Therefore, 12 V from D8 and D9 switches Q22 on and the killer output goes low to produce the monochrome mode. Setting the mode switch to B/W switches Q23 off. Voltage is then supplied to Q22 through D10 and the killer output becomes low.

When a color signal is present in the auto mode, the burst detector circuit sets IC6 pin 3 high. When this high exceeds the killer set voltage, IC6 pin 6 goes high and the color killer output becomes high. Setting the mode switch to color holds the killer set voltage at 0 V and the color killer output stays high.

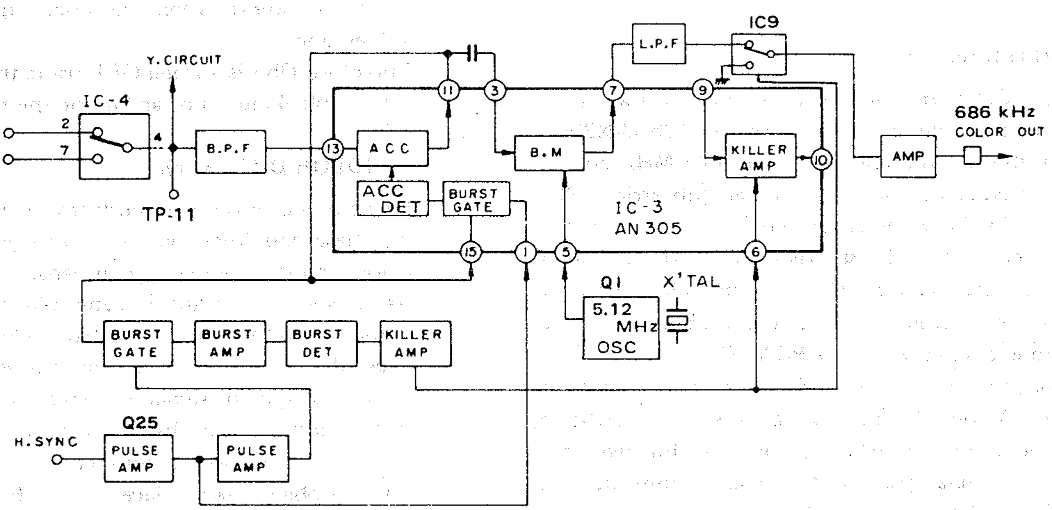

Y.CIRCUIT
IC-4
2
7
4
TP-11
B.P.F
13
ACC
ACC DET
BURST GATE
11
3
B.M
7
L.P.F
IC9
9
KILLER AMP
10
IC-3
AN 305
15
1
5
6
Q1
X'TAL
5.12 MHz OSC
AMP
686 kHz
COLOR OUT
BURST GATE
BURST AMP
BURST DET
KILLER AMP
Q25
H.SYNC
PULSE AMP
PULSE AMP

Fig. 3-72

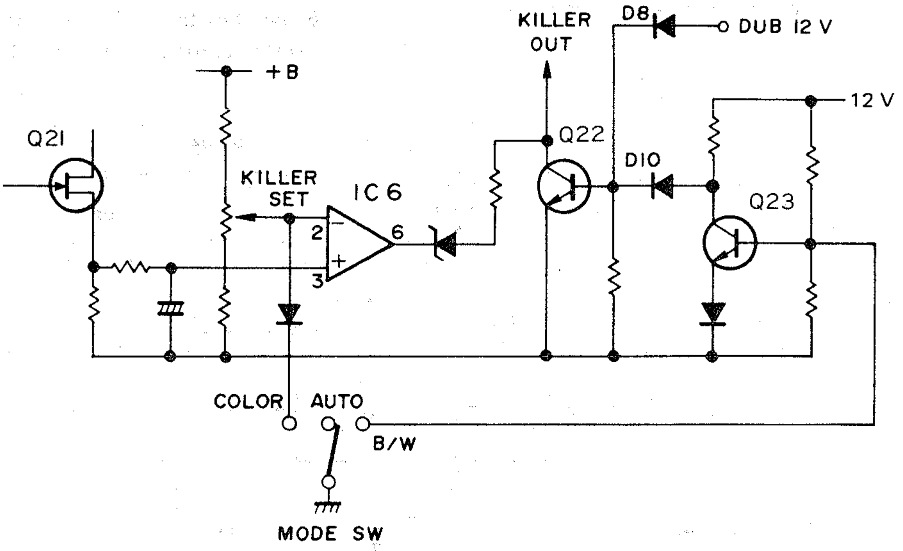

KILLER OUT
D8
DUB 12 V
+B
12 V
Q21
Q22
D10
Q23
KILLER SET
IC 6
2
3
6
COLOR
AUTO
B/W
MODE SW

Fig. 3-73

3.7.4 Playback color circuit

This circuit functions to correct time axis fluctuations in the playback color signal. A filter separates the 686 kHz color component from the playback FM signal and sends it to the PB color board. The ACC circuit of IC1 (AN305) stabilizes level fluctuations due to irregularities in tape sensitivity and tape to head contact. This IC also contains a frequency conversion circuit. See Fig. 3-74.

The color signal for FM-FM dubbing is obtained from the 686 kHz color component through the ACC. Since the burst level decreases every time dubbing is performed, only the burst signal portion is enhanced. When Q5 amplifies the ACC output, Q7 in Q5 emitter circuit becomes on only in the presence of the burst signal. This connects R29, L3 and C24 in parallel with Q5 emitter resistance (1.2 kΩ), increasing burst amplification.

- **APC VCO Circuit**

The APC VCO (automatic phase control, voltage controlled oscillator) circuit is contained in IC5 (AN306). Inputs of this circuit are either the 4.43 MHz crystal oscillator frequency or an external subcarrier (SC) and the 4.43 MHz playback color signal from the frequency converter. These frequencies are compared and the resulting 279 kHz VCO control signal appears at pin 6, and the output at pin 1. Fig. 3-75 indicates the main peripheral circuit of the APC VCO.

The frequency converted 4.43 MHz color signal is applied to IC5 pin 25, the color burst sampling pulse to pin 27, and the separated burst signal is obtained from pin 23. This signal goes to the phase comparator via pin 22. The 4.43 MHz reference signal also goes to the phase comparator via pin 16. This reference signal is selected automatically by an electronic switch for either the IC6 internal crystal or an externally supplied subcarrier input.

At the VCO, the output of the phase comparator is applied as the 279 kHz control signal, while the other control voltage is DC from the color lock control. In other words, the VCO input can be considered the phase comparator output added to the DC bias voltage by the color lock control.

The 279.29 kHz frequency produced by the VCO is added to the 406.25 kHz of the AFC VCO, resulting in 686 kHz.

Of the C62, R56 and R59 connected to the pin 6 of the IC5 which controls the VCO of the APC, R56 is shorted by Q13 during normal playback. However when in the Search mode R56 is placed in series with R59 turning Q13 OFF. This weakens the effect of C62 and speeds up APC response during search. Furthermore, because there are no bursts during V blanking, APC lock up time is delayed due to the time constant of the C62 and R59 mentioned above when the video signal starts after the V blanking.

Therefore Q55 is turned OFF using the drum pulse right after V blanking – not activating the filters.

- **COLOR DUB switch**

PB color signal is separated from the PB video signal and its phase and frequency are corrected in the playback color circuit. Frequency compensation is based on the frequency drift of the H sync. When this corrected PB signal is dubbed onto another VCR unit and played back, the H sync frequency drift is as it was before correction. The color signal is corrected again based on this drift – drifting from the corrected condition further.

The color lock loop thereby causes excessive drift every time dubbing takes place. The CR-8250 therefore is equipped with a color dub switch which improves dubbing quality by cutting the loop when dubbing.

When the color dub switch is ON, the electronic switch IC8 switches the 5.12 MHz signal, which enters the main converter contained within IC1 of the color processing

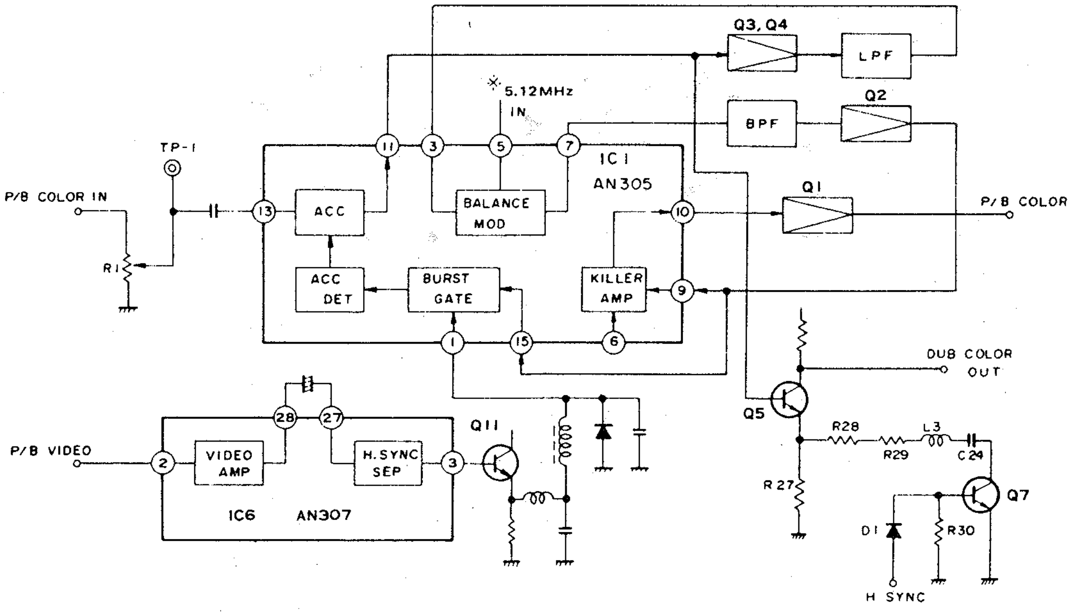


Fig. 3-74

circuit, reference 5.12 MHz oscillator output from the color lock loop output. This color signal therefore contains error and will be corrected when the dubbed tape is played back.

■ AFC VCO circuit

The AFC VCO (automatic frequency control, voltage controlled oscillator) is contained in IC6 (AN307). Fig. 3-76 shows the main peripheral circuit.
This circuit functions to produce a fluctuating 406.25 kHz proportional to the time axis fluctuations of the horizontal sync component in the playback video signal.

In IC6, the 406.25 kHz signal is divided 1/26th to 15.625 kHz and compared in phase with the horizontal sync signal from pin 2. If the two signals do not agree, an error voltage becomes produced which is fed back to the VCO. Consequently, the internal VCO oscillator frequency is continuously synchronized with the input horizontal sync.

The resulting 406.25 kHz and the 279.29 kHz from the APC VCO are added in balanced modulator-1 (BM-1) to yield 686 kHz. This 686 kHz is aligned with the time axis fluctuations in the playback color input.
In balanced modulator-2 (BM-2), the fluctuating 686 kHz and 4.43 MHz from the crystal oscillator are added to produce 5.12 MHz.

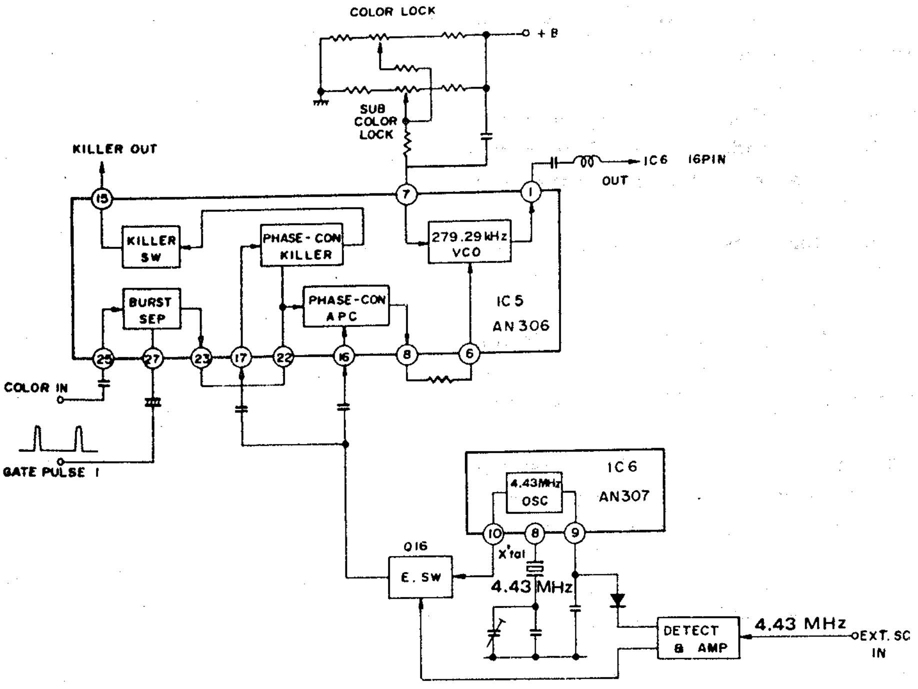

COLOR LOCK
+B
SUB COLOR LOCK
KILLER OUT
IC6 16PIN
OUT
15
7
1
KILLER SW
PHASE-CON KILLER
279.29 kHz VCO
BURST SEP
PHASE-CON APC
IC5
AN306
25
27
23
17
22
16
8
6
COLOR IN
GATE PULSE I
IC6
4.43MHz OSC
AN307
10
8
9
Q16
E. SW
X'tal
4.43 MHz
DETECT & AMP
4.43 MHz
EXT. SC IN

Fig. 3-75

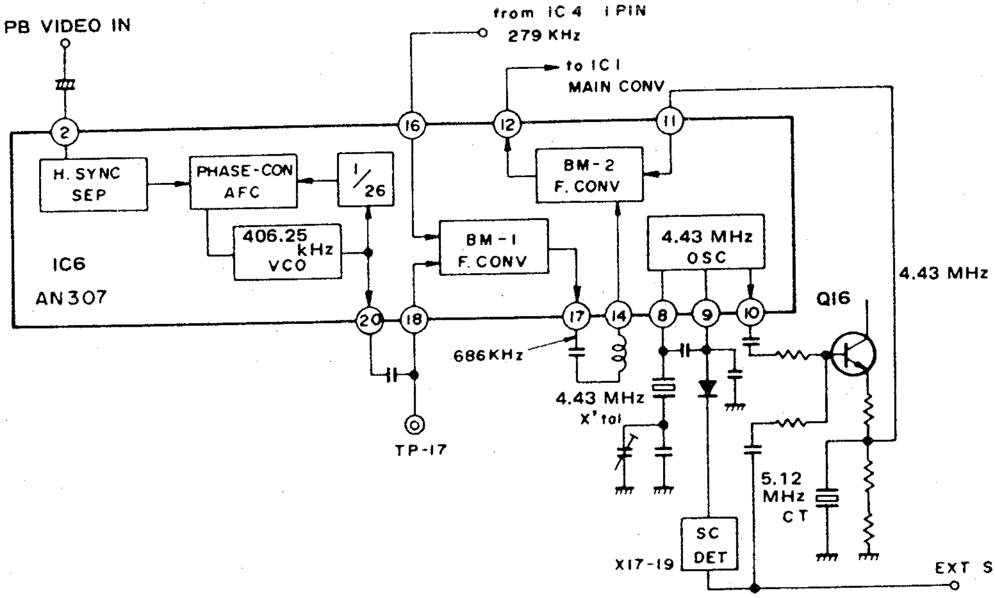

PB VIDEO IN
from IC 4 1 PIN
279 KHz
to IC 1
MAIN CONV
2
16
12
11
H. SYNC SEP
PHASE-CON AFC
1/26
BM-2
F. CONV
406.25 kHz VCO
BM-1
F. CONV
4.43 MHz OSC
IC6
AN307
4.43 MHz
Q16
20
18
17
14
8
9
10
686 KHz
4.43 MHz
X'tal
TP-17
5.12 MHz CT
SC DET
X17-19
EXT SC IN

Fig. 3-76

■ Time Code Noise Canceller

The time code is recorded in the vertical blanking interval. When played back using a general-purpose VCR, which does not possess a circuit for removing the time code from the video signal, vertical sync disturbance can occur.

Since the time code possesses a low fundamental frequency of 4.8 kHz, it serves as noise in the color circuit during playback. Therefore, gating is used for cancelling the noise in the playback color circuit during the time code interval.

Fig. 3-77A shows the video signal with noise present, while B shows the pulse produced by the monostable multivibrator of IC7 from the vertical sync component of the playback video signal. R119 adjusts so that this pulse fall becomes cut just before the initial burst is obtained after vertical blanking, thus cutting the noise between V sync and the first burst.

This pulse alone is not sufficient for eliminating the noise. Consequently, IC7 produces pulse C from the drum flip-flop signal for cancelling the noise at the front porch of V. sync.

It is not feasible to increase the pulse width of C and employ it for B. Due to jitter, pulse C does not remain constant with respect to the position of signal A, yielding the risk of also cutting off the initial burst. On the other hand, pulse B uses the playback video signal and consequently, its positional relationship with respect to A does not deviate.

Pulses B and C are mixed at D10 and D11, then sent to Q10 base. Q10 switches on during the pulse interval, thereby cancelling time code noise in the playback color circuit.

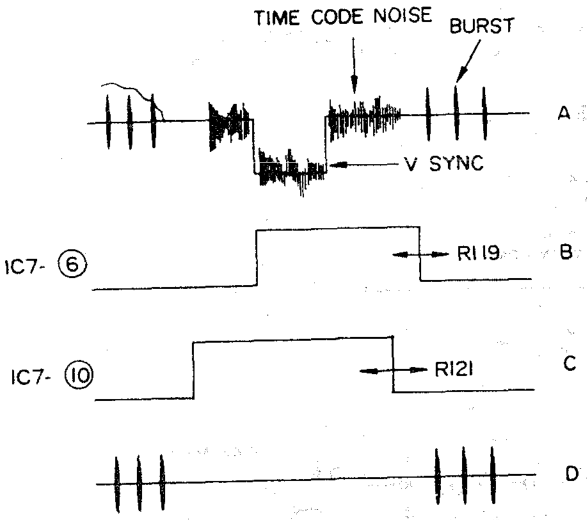


Fig. 3-77 Time code noise elimination

3.8 COLOR FRAME SERVO CIRCUIT DESCRIPTION

3.8.1 Color burst phase in the PAL system

Figure 3-78 is the PAL system color burst phase.

1. In the PAL system, the R-Y signal reverses every 1H.
2. The burst starting position repeats every 4 fields.
3. The burst blanking pulse advances 1/2 H (90°) every field and returns to the starting position at the 4th field. By this method, the same burst phase is obtained at the start and end of all fields.
4. Intervals of burst absence occur within the burst blanking period.

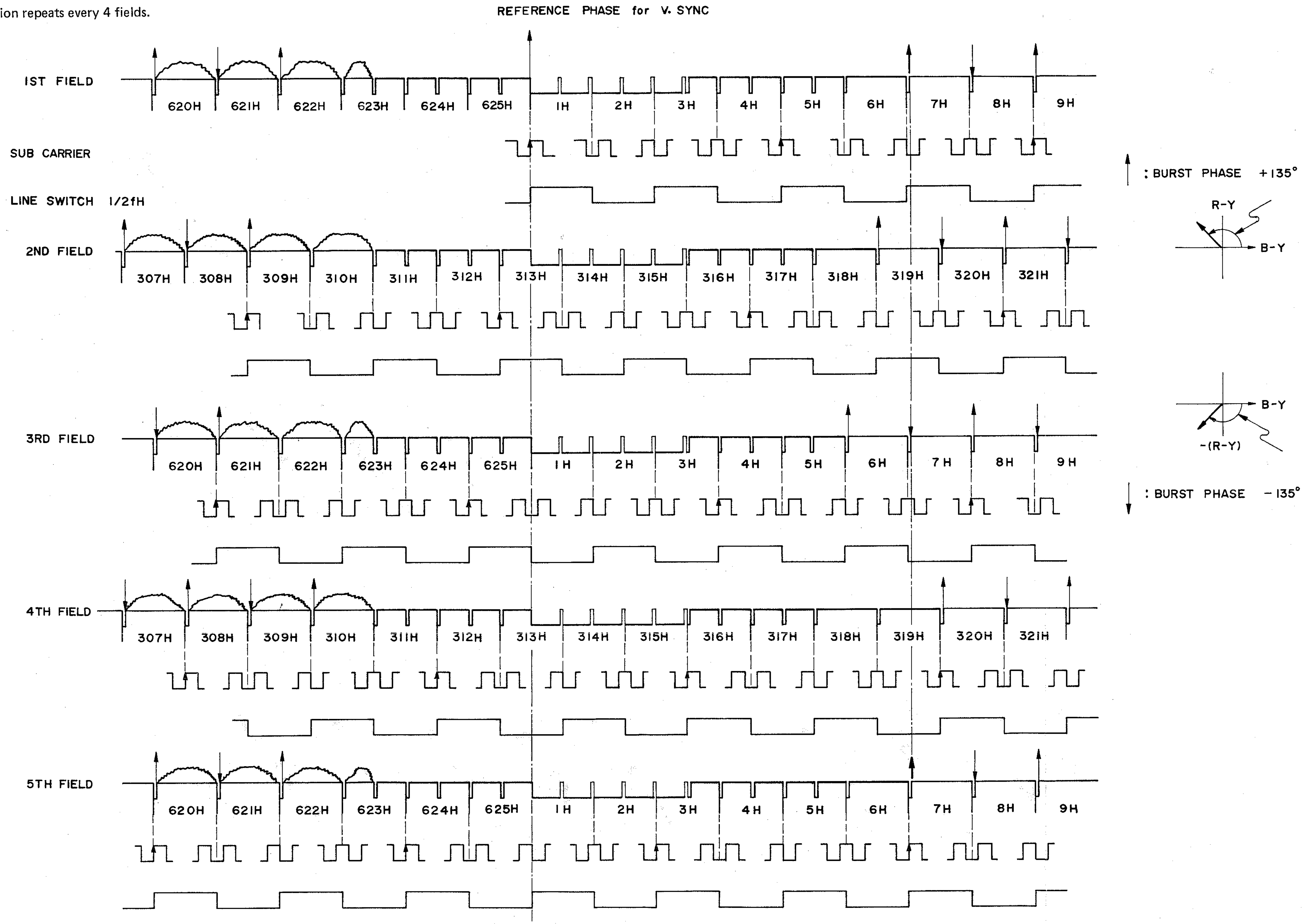

REFERENCE PHASE for V. SYNC
IST FIELD
620H 621H 622H 623H 624H 625H 1H 2H 3H 4H 5H 6H 7H 8H 9H
SUB CARRIER
LINE SWITCH 1/2fH
2ND FIELD
307H 308H 309H 310H 311H 312H 313H 314H 315H 316H 317H 318H 319H 320H 321H
3RD FIELD
620H 621H 622H 623H 624H 625H 1H 2H 3H 4H 5H 6H 7H 8H 9H
4TH FIELD
307H 308H 309H 310H 311H 312H 313H 314H 315H 316H 317H 318H 319H 320H 321H
5TH FIELD
620H 621H 622H 623H 624H 625H 1H 2H 3H 4H 5H 6H 7H 8H 9H
: BURST PHASE +135°
R-Y
B-Y
B-Y
-(R-Y)
: BURST PHASE -135°

Fig. 3-78

3.8.2 Color burst phase within tape pattern

As indicated in Fig. 3-79, the color frame pulse of the signal recorded on the tape pattern is aligned with that of the input signal. The color frame circuit functions to control the color burst phase of the signal recorded on the tape.

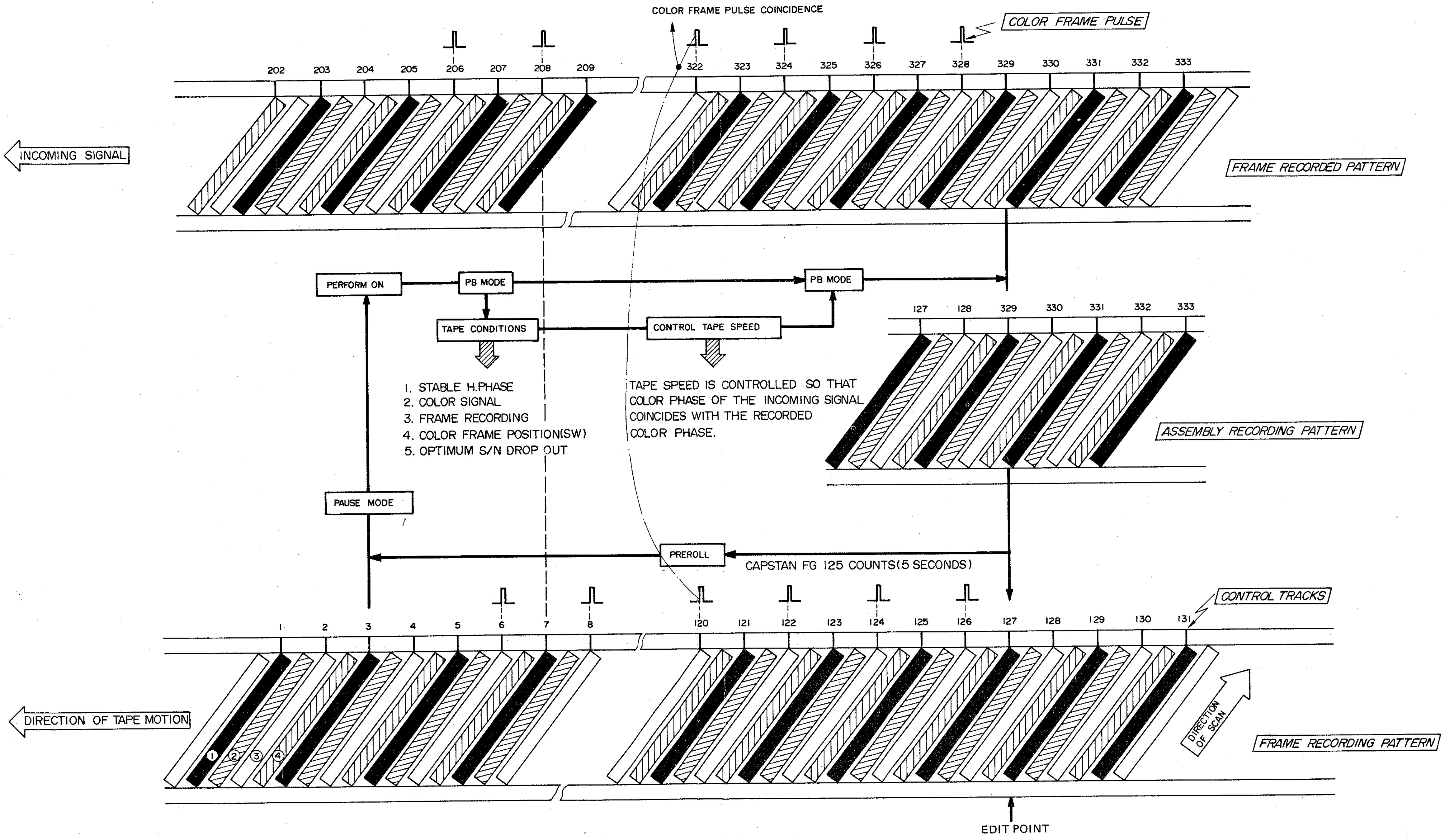

COLOR FRAME PULSE COINCIDENCE
COLOR FRAME PULSE
202
203
204
205
206
207
208
209
322
323
324
325
326
327
328
329
330
331
332
333
INCOMING SIGNAL
FRAME RECORDED PATTERN
PERFORM ON
PB MODE
PB MODE
TAPE CONDITIONS
CONTROL TAPE SPEED
1. STABLE H.PHASE
2. COLOR SIGNAL
3. FRAME RECORDING
4. COLOR FRAME POSITION(SW)
5. OPTIMUM S/N DROP OUT
TAPE SPEED IS CONTROLLED SO THAT COLOR PHASE OF THE INCOMING SIGNAL COINCIDES WITH THE RECORDED COLOR PHASE.
127
128
329
330
331
332
333
ASSEMBLY RECORDING PATTERN
PAUSE MODE
PREROLL
CAPSTAN FG 125 COUNTS(5 SECONDS)
CONTROL TRACKS
1
2
3
4
5
6
7
8
120
121
122
123
124
125
126
127
128
129
130
131
DIRECTION OF TAPE MOTION
①
②
③
④
DIRECTION OF SCAN
FRAME RECORDING PATTERN
EDIT POINT

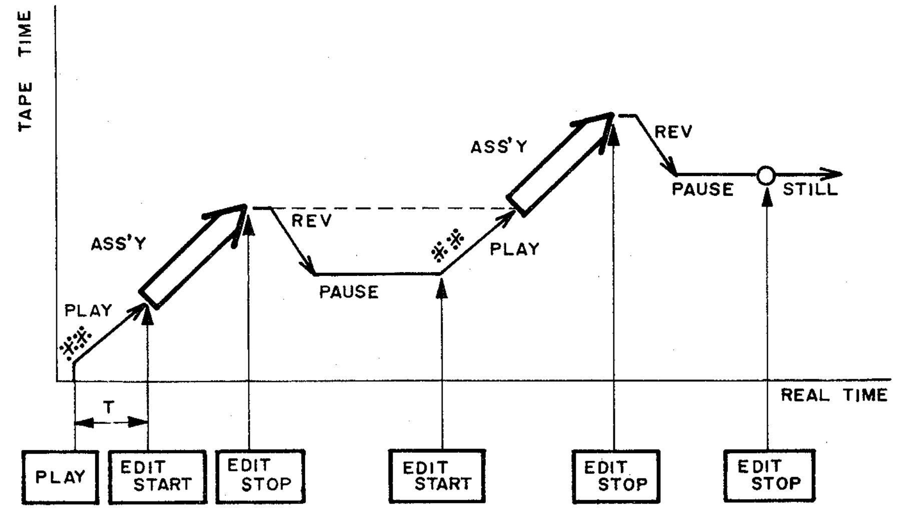
Fig. 3-79

3-60

3.8.3 Block diagram description

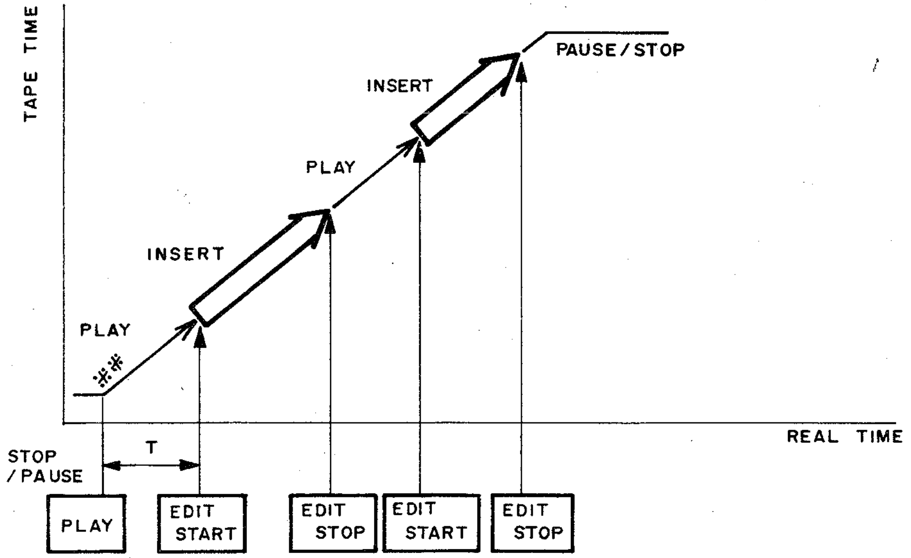
1. Figure 3-80 illustrates a simplified diagram of a typical color frame servo. The color frame servo produces a DC level, which varies the color frame error switch output. This regulates the capstan speed to correct the color frame in order that the color frame of the incoming signal coincides with the reproduced color frame.

1) ASSEMBLY EDIT (Without remote)

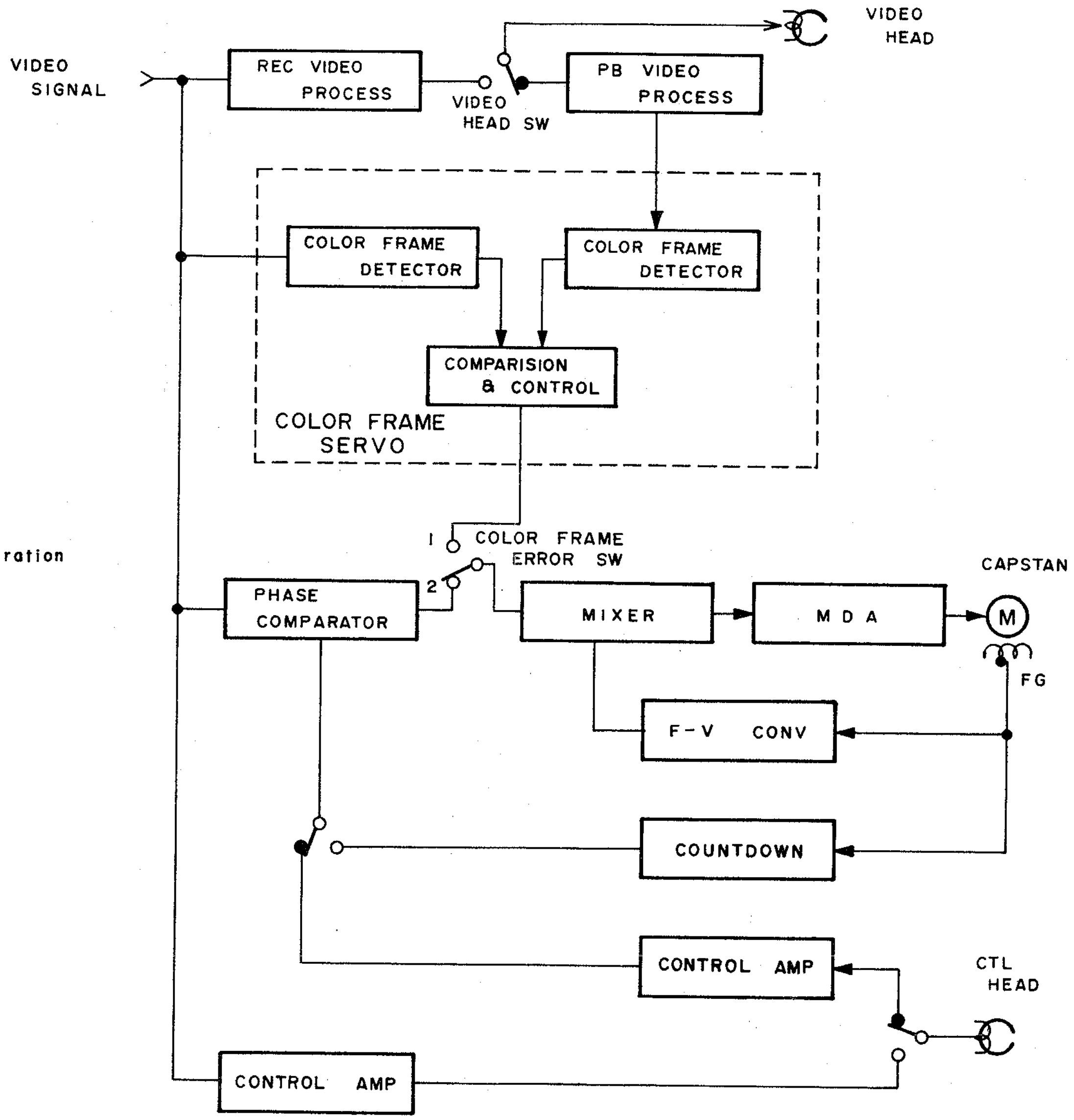


※※ : Color frame servo operation
T : Min. 5sec required

2) INSERT EDIT (Without remote)



3) SIMPLIFIED BLOCK DIAGRAM



VIDEO SIGNAL
REC VIDEO PROCESS
VIDEO HEAD SW
PB VIDEO PROCESS
VIDEO HEAD
COLOR FRAME DETECTOR
COLOR FRAME DETECTOR
COMPARISION & CONTROL
COLOR FRAME SERVO
1
2
COLOR FRAME ERROR SW
PHASE COMPARATOR
MIXER
M D A
CAPSTAN
M
FG
F-V CONV
COUNTDOWN
CONTROL AMP
CTL HEAD
CONTROL AMP

4) PHASE LED OPERATION

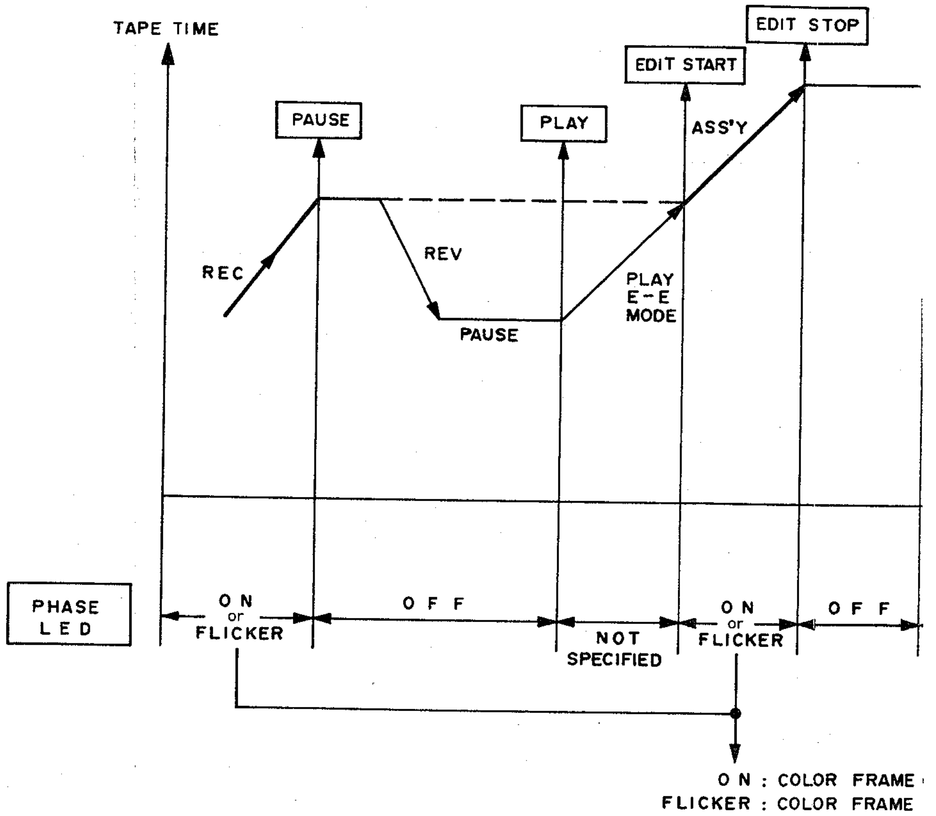
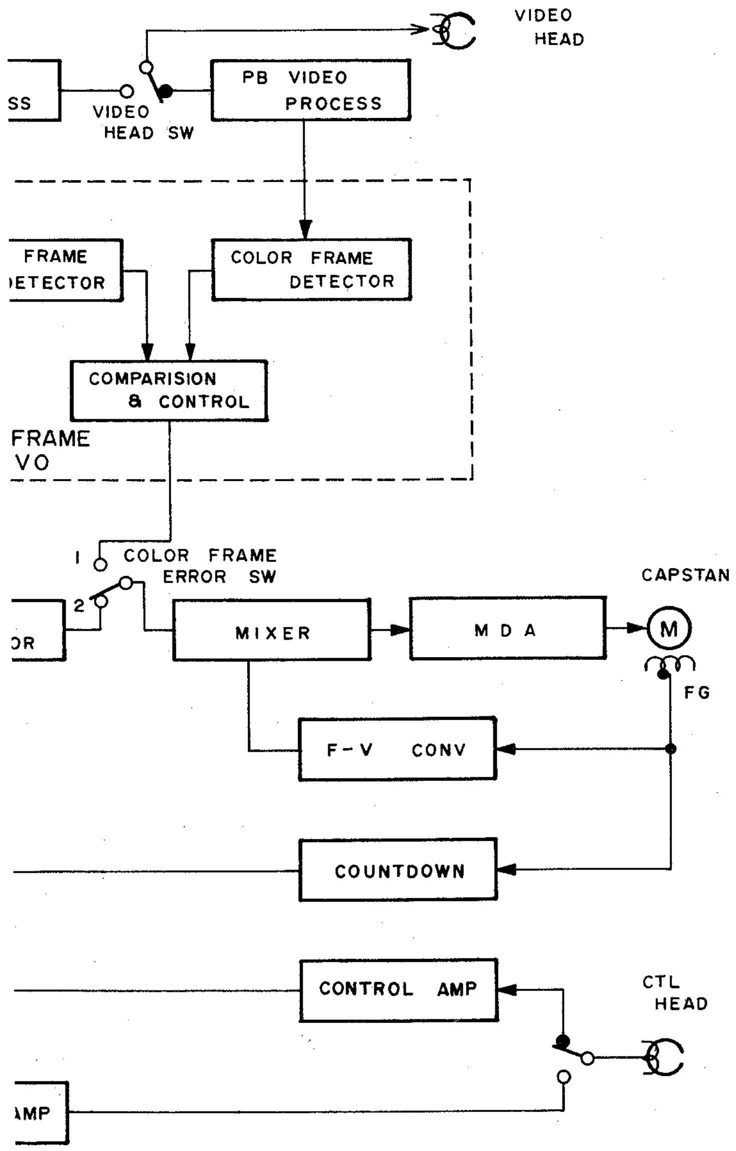
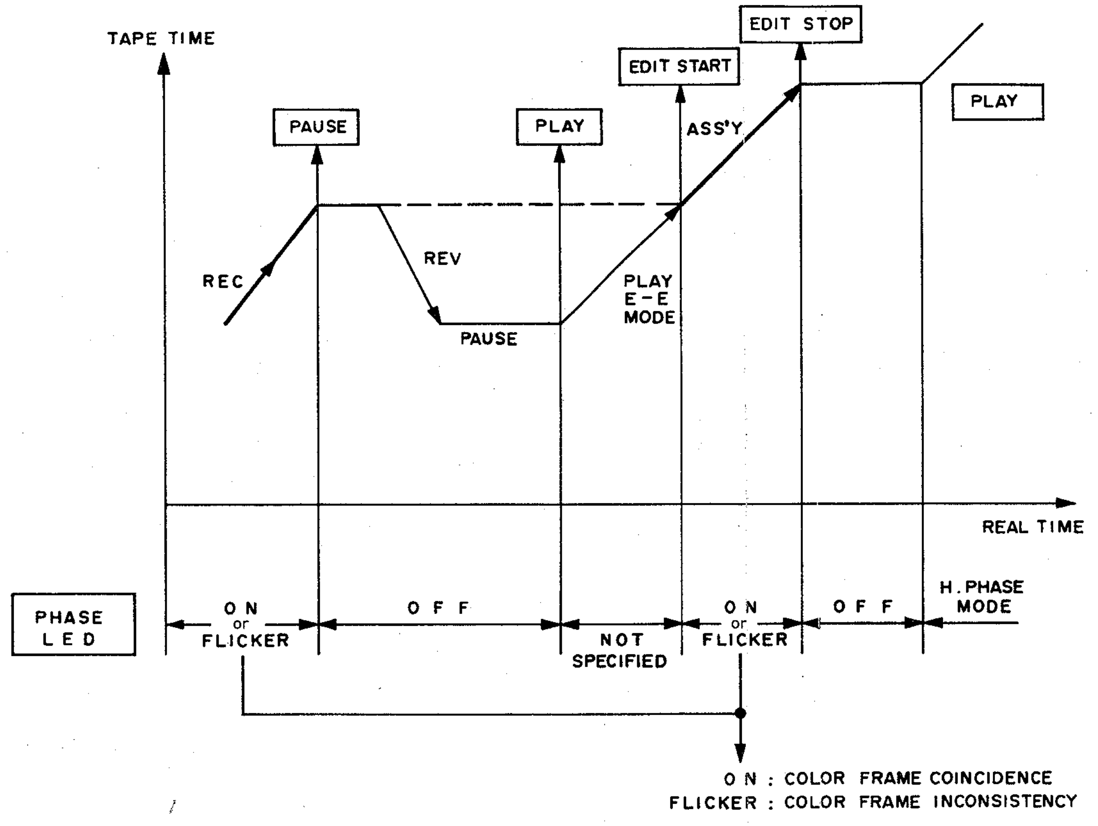


Fig. 3-80

CK DIAGRAM


VIDEO HEAD
SS
VIDEO HEAD SW
PB VIDEO PROCESS
FRAME
ETECTOR
COLOR FRAME DETECTOR
COMPARISION & CONTROL
FRAME
VO
1
COLOR FRAME ERROR SW
2
CAPSTAN
OR
MIXER
M D A
M
FG
F-V CONV
COUNTDOWN
CONTROL AMP
CTL HEAD
MP

4) PHASE LED OPERATION


TAPE TIME
EDIT STOP
EDIT START
PAUSE
PLAY
PLAY
ASS'Y
REC
REV
PAUSE
PLAY
E-E
MODE
REAL TIME
PHASE LED
ON or FLICKER
OFF
NOT SPECIFIED
ON or FLICKER
OFF
H.PHASE MODE
ON : COLOR FRAME COINCIDENCE
FLICKER : COLOR FRAME INCONSISTENCY

5) PREROLL

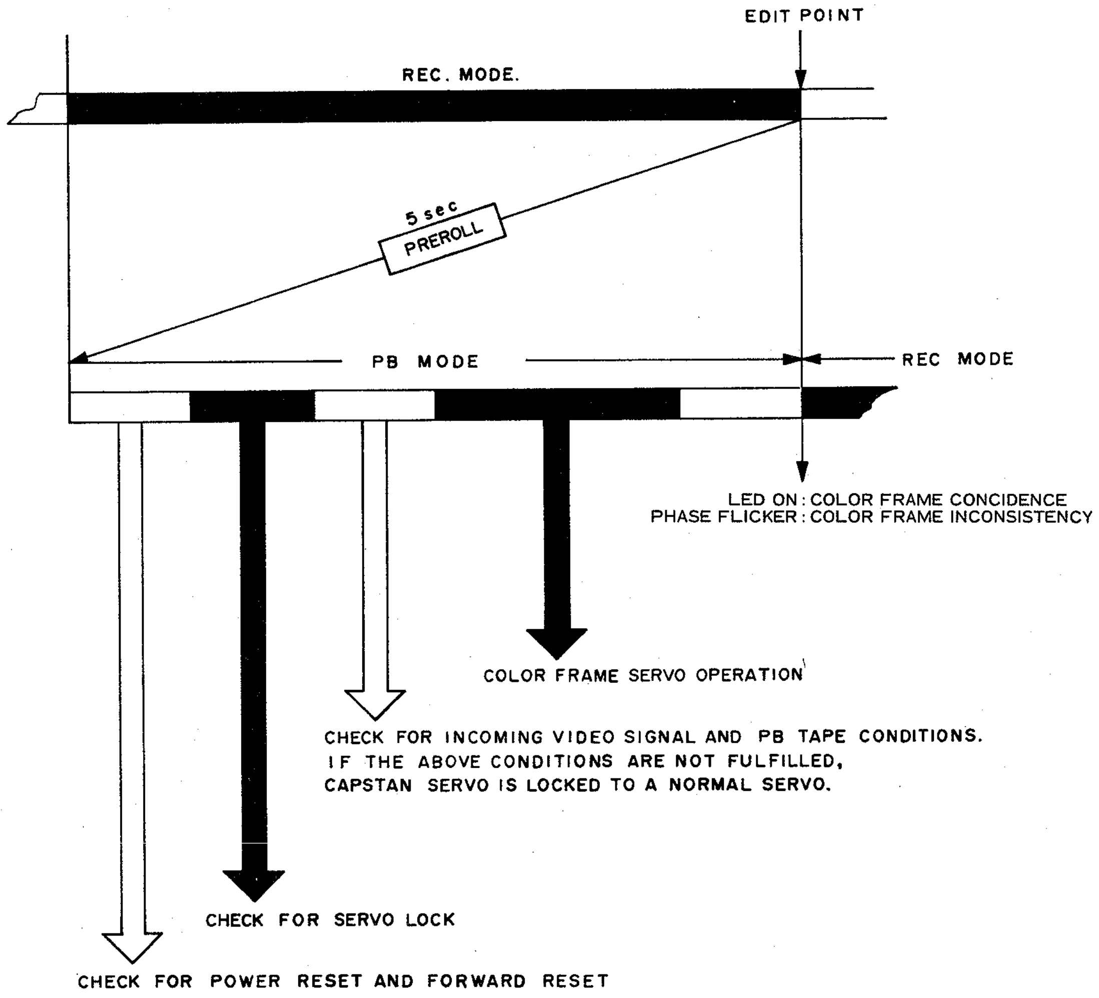

EDIT POINT
REC. MODE.
5 sec
PREROLL
PB MODE
REC MODE
LED ON : COLOR FRAME CONCIDENCE
PHASE FLICKER : COLOR FRAME INCONSISTENCY
COLOR FRAME SERVO OPERATION
CHECK FOR INCOMING VIDEO SIGNAL AND PB TAPE CONDITIONS.
IF THE ABOVE CONDITIONS ARE NOT FULFILLED,
CAPSTAN SERVO IS LOCKED TO A NORMAL SERVO.
CHECK FOR SERVO LOCK
CHECK FOR POWER RESET AND FORWARD RESET

Fig. 3-81

2. The block diagram is shown in Fig. 3-94.

- Incoming video signal
  The input signal is obtained from pin 4 of the drum servo circuit and routed via connector P222 pin 1 of the color frame servo circuit to IC40 pin 16 and transistor Q1. Through Q1 emitter-follower and band-pass filter BPF-1 (4.43 MHz), the signal is applied to the color amplifier of IC2.
  The amplified signal goes via Q9 emitter-follower and IC1 pin 8 to the burst separator.

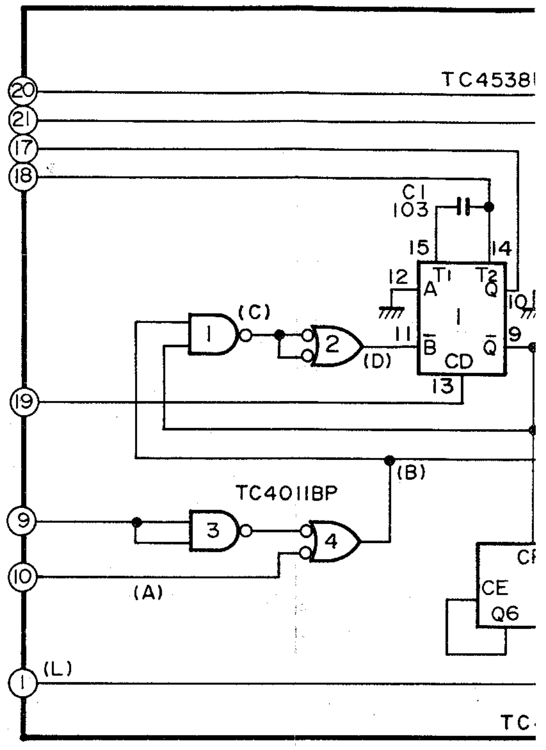
  In another route, the video signal at IC40 pin 16 is amplified and applied to the horizontal sync separator, yielding the H sync component at IC40 pin 13. This is amplified by Q2 and Q3, then sent via IC1 pin 3 to the gate pulse circuit. (Adjust L1 to position the burst at the center of the gate pulse at TP2).
  The output from the gate pulse circuit goes to the burst separator, then the burst amplifier to yield the color signal at IC1 pin 11. (Adjust L1 and L2 for maximum signal above 0.6 Vp-p and minimum noise below 0.3 Vp-p at TP5.)

  Diodes D1 and D2 rectify the signal and supply it to IC4 pin 7, where it is compared with the reference voltage. (Adjust R15 to obtain 0.4 ± 0.02 V at TP6.)
  (Since the rectified voltage from the diodes contains ripple and noise components, a large output voltage variation becomes produced whenever this voltage value crosses that of the reference voltage. In order to reduce this effect, Q4 functions to compensate by adjusting the reference voltage value and introducing a hysteresis difference with respect to the input voltage rise and fall.)

  The resulting output goes via IC3 pin 1 to the color frame detector, while the H sync via Q2 and Q3 is applied to IC3 pin 10. (Adjust R20 for 45 ± 1 μsec at TP10.) Consequently, IC3 detects the color frame pulse at the 3rd field, at which time high potential appears at pin 3 and low at pin 2. IC3 pin 4 is high only at the 1st and 3rd fields.

- PB video signal
  The PB video signal functions in the same manner as incoming video signal.

3. 21VT09 block



Truth table

TC4538BP

INPUT			OUTPUT		NOTE
A_{IN}	B_{IN}	CD	Q	$\overline{Q}$	
↑	H	H	⊓	⊔	OUTPUT ENABLE
↑	L	H	L	H	INHIBIT
H	↓	H	L	H	INHIBIT
L	↓	H	⊓	⊔	OUTPUT ENABLE
*	*	L	L	H	INHIBIT

* Don't Care

CLOCK △
*
*
L
↑
↓
H
H

△ : Level C
: Don't C
NC : No Char

CARRY OUT

2. The block diagram is shown in Fig. 3-94.

- Incoming video signal

  The input signal is obtained from pin 4 of the drum servo circuit and routed via connector P222 pin 1 of the color frame servo circuit to IC40 pin 16 and transistor Q1. Through Q1 emitter-follower and band-pass filter BPF-1 (4.43 MHz), the signal is applied to the color amplifier of IC2.

  The amplified signal goes via Q9 emitter-follower and IC1 pin 8 to the burst separator.

  In another route, the video signal at IC40 pin 16 is amplified and applied to the horizontal sync separator, yielding the H sync component at IC40 pin 13. This is amplified by Q2 and Q3, then sent via IC1 pin 3 to the gate pulse circuit. (Adjust L1 to position the burst at the center of the gate pulse at TP2).

  The output from the gate pulse circuit goes to the burst separator, then the burst amplifier to yield the color signal at IC1 pin 11. (Adjust L1 and L2 for maximum signal above 0.6 Vp-p and minimum noise below 0.3 Vp-p at TP5.)

  Diodes D1 and D2 rectify the signal and supply it to IC4 pin 7, where it is compared with the reference voltage. (Adjust R15 to obtain 0.4 ± 0.02 V at TP6.)

  (Since the rectified voltage from the diodes contains ripple and noise components, a large output voltage variation becomes produced whenever this voltage value crosses that of the reference voltage. In order to reduce this effect, Q4 functions to compensate by adjusting the reference voltage value and introducing a hysteresis difference with respect to the input voltage rise and fall.)

  The resulting output goes via IC3 pin 1 to the color frame detector, while the H sync via Q2 and Q3 is applied to IC3 pin 10. (Adjust R20 for 45 ± 1 μsec at TP10.) Consequently, IC3 detects the color frame pulse at the 3rd field, at which time high potential appears at pin 3 and low at pin 2. IC3 pin 4 is high only at the 1st and 3rd fields.

- PB video signal

  The PB video signal functions in the same manner as incoming video signal.

3. 21VT09 block

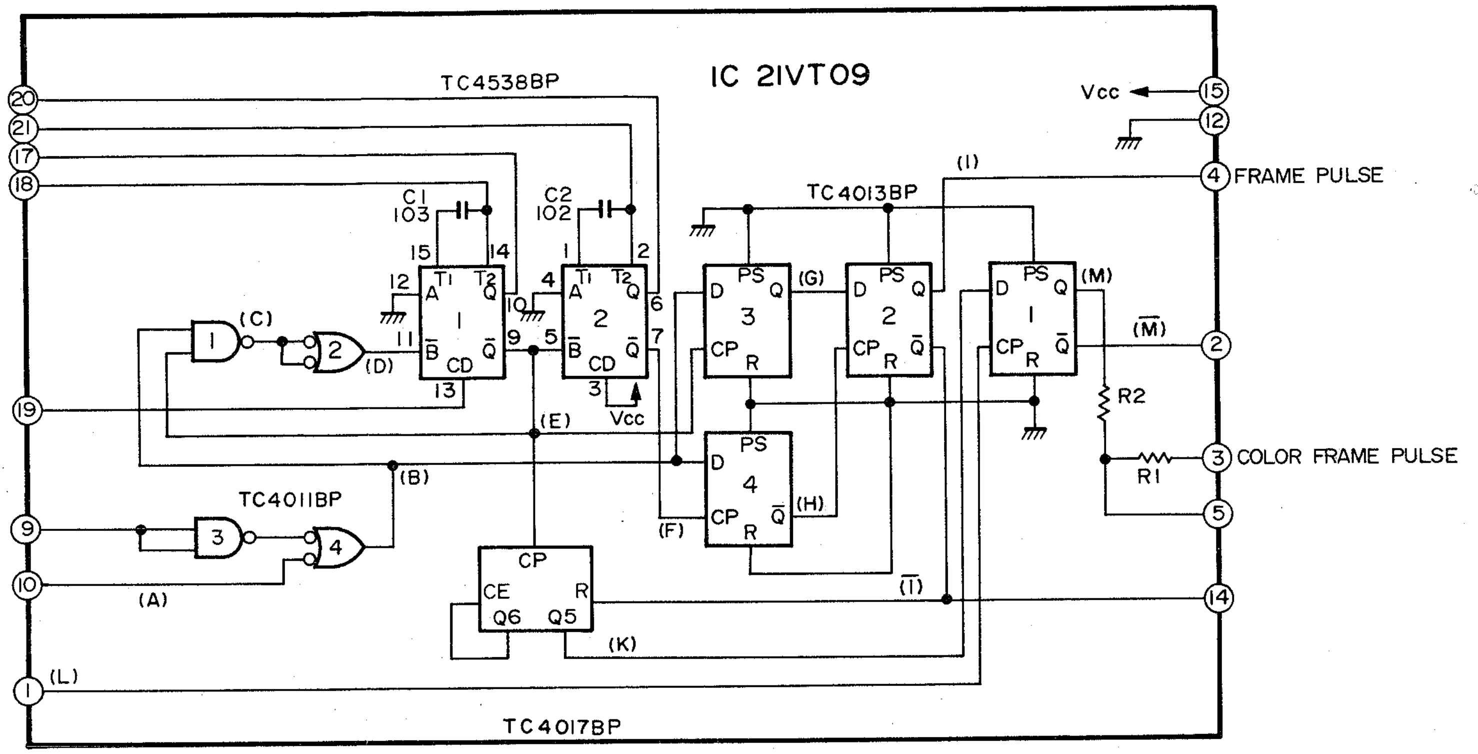


Fig. 3-82

Truth table

TC4538BP

INPUT			OUTPUT		NOTE
A_{IN}	B_{IN}	CD	Q	$\bar{Q}$	
↑	H	H	⊓	⊔	OUTPUT ENABLE
↑	L	H	L	H	INHIBIT
H	↓	H	L	H	INHIBIT
L	↓	H	⊓	⊔	OUTPUT ENABLE
*	*	L	L	H	INHIBIT

* Don't Care

TC4017BP

INPUTS			SELECTED OUTPUT
CLOCK △	$\overline{CE}$ △	CLEAR	
*	*	H	Q_0
*	H	L	Q_n (NC)
L	*	L	Q_n (NC)
↑	L	L	Q_{n+1}
↓	L	L	Q_n (NC)
H	↑	L	Q_n (NC)
H	↓	L	Q_{n+1}

△ : Level Change
  : Don't Care
NC : No Change

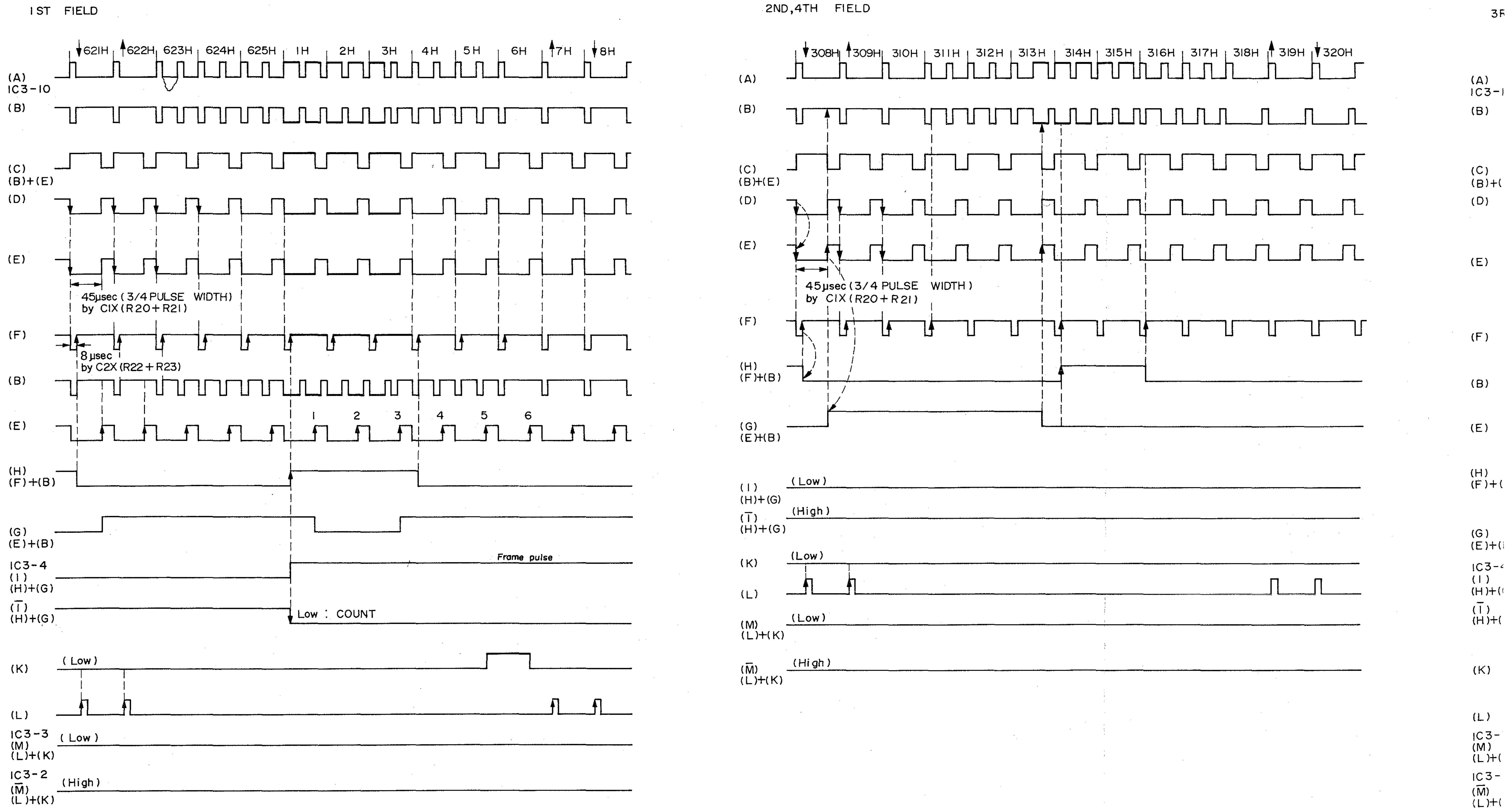
CARRY OUT 'H' ..... $Q_0 \sim Q_4$ = 'H'
'L' ..... $Q_5 \sim Q_9$ = 'H'

TC4013BP

INPUTS				OUTPUTS	
CL	PR	D	CP△	Q_{n+1}	$\bar{Q}_{n+1}$
L	H	*	*	H	L
H	L	*	*	L	H
H	H	*	*	L	H
L	L	L	↑	L	H
L	L	H	↑	H	L
L	L	*	↓	Q_n*	$\bar{Q}_n$*

  : Don't Care
△ : Level Change
* : No Change

4. Color frame detector timing chart



1ST FIELD

2ND,4TH FIELD

621H
622H
623H
624H
625H
1H
2H
3H
4H
5H
6H
7H
8H
(A)
IC3-10
(B)
(C)
(B)+(E)
(D)
(E)
45μsec (3/4 PULSE WIDTH)
by C1X (R20+R21)
(F)
8μsec
by C2X (R22+R23)
(B)
(E)
1
2
3
4
5
6
(H)
(F)+(B)
(G)
(E)+(B)
IC3-4
(I)
(H)+(G)
(Ī)
(H)+(G)
Frame pulse
Low : COUNT
(K)
(Low)
(L)
IC3-3
(M)
(L)+(K)
(Low)
IC3-2
(M̄)
(L)+(K)
(High)
308H
309H
310H
311H
312H
313H
314H
315H
316H
317H
318H
319H
320H
(A)
(B)
(C)
(B)+(E)
(D)
(E)
45μsec (3/4 PULSE WIDTH)
by C1X (R20+R21)
(F)
(H)
(F)+(B)
(G)
(E)+(B)
(I)
(H)+(G)
(Low)
(Ī)
(H)+(G)
(High)
(K)
(Low)
(L)
(M)
(L)+(K)
(Low)
(M̄)
(L)+(K)
(High)
3F
(A)
IC3-
(B)
(C)
(B)+(
(D)
(E)
(F)
(B)
(E)
(H)
(F)+(
(G)
(E)+(
IC3-
(I)
(H)+(
(Ī)
(H)+(
(K)
(L)
IC3-
(M)
(L)+(
IC3-
(M̄)
(L)+(

Fig. 3-83

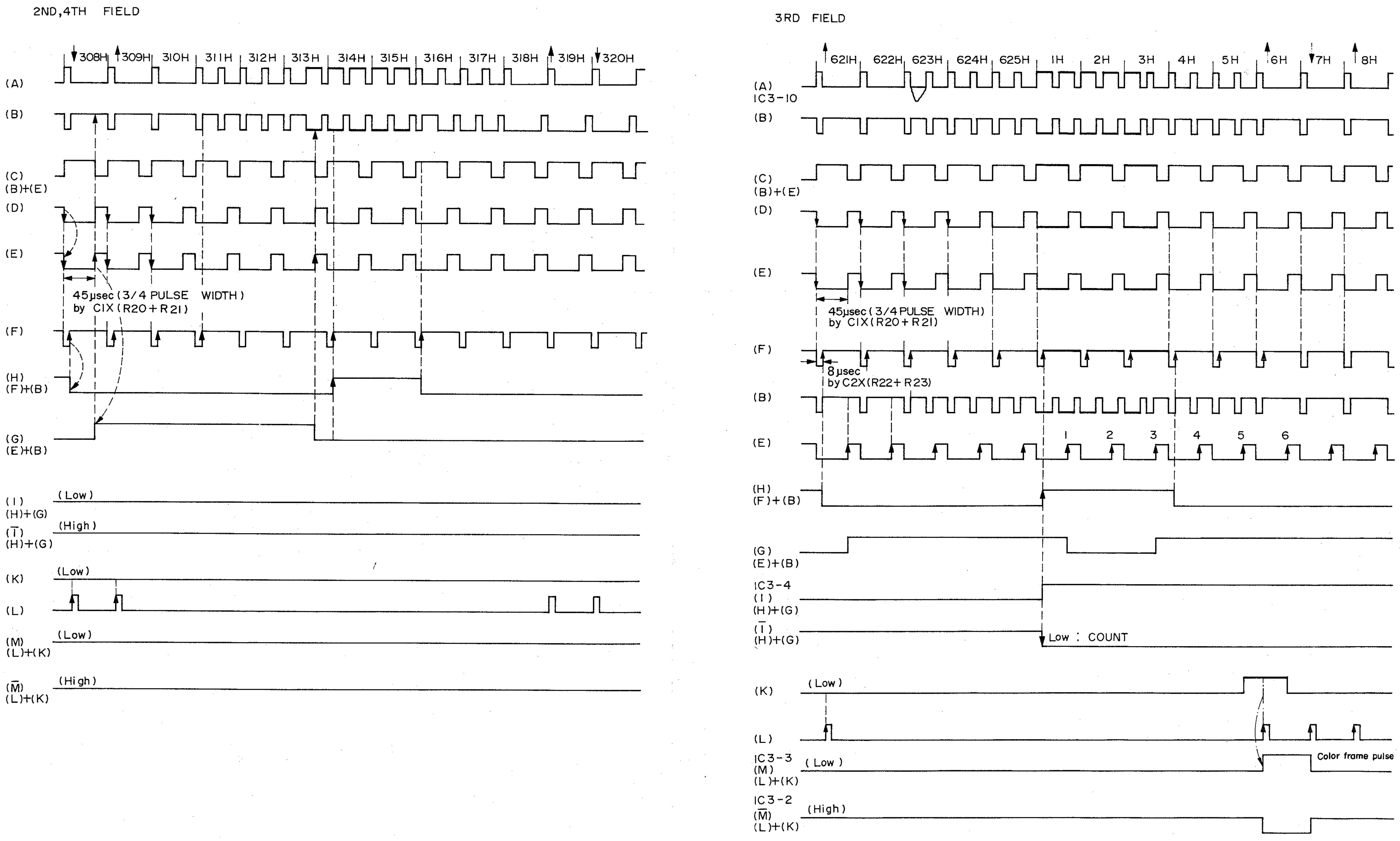

2ND,4TH FIELD
308H
309H
310H
311H
312H
313H
314H
315H
316H
317H
318H
319H
320H
(A)
(B)
(C)
(B)+(E)
(D)
(E)
45μsec (3/4 PULSE WIDTH)
by C1X (R20+R21)
(F)
(H)
(F)+(B)
(G)
(E)+(B)
(I)
(H)+(G)
(Low)
(Ī)
(H)+(G)
(High)
(K)
(Low)
(L)
(M)
(L)+(K)
(Low)
(M̄)
(L)+(K)
(High)
3RD FIELD
621H
622H
623H
624H
625H
1H
2H
3H
4H
5H
6H
7H
8H
(A)
IC3-10
(B)
(C)
(B)+(E)
(D)
(E)
45μsec (3/4 PULSE WIDTH)
by C1X (R20+R21)
(F)
8μsec
by C2X (R22+R23)
(B)
(E)
1
2
3
4
5
6
(H)
(F)+(B)
(G)
(E)+(B)
IC3-4
(I)
(H)+(G)
(Ī)
(H)+(G)
Low : COUNT
(K)
(Low)
(L)
IC3-3
(M)
(L)+(K)
(Low)
Color frame pulse
IC3-2
(M̄)
(L)+(K)
(High)

Fig. 3-83

5. Reference pulse and servo lock timing chart

TC40103BP

The TC40103BP is composed of an 8-bit binary counter. Maximum count is 255.

With the CI (Carry Input) low level, when the count reaches 0, a low level output appears at pin 14. If CI is high, the pin 14 output remains high regardless of the count.

Low at $\overline{\text{APE}}$ (Asynchronous Preset Enable) applies the preset input (PI 0 – PI 7) values to the counter, regardless of the input.

Low at $\overline{\text{CLR}}$ (Clear) sets the counter for the maximum count, regardless of other inputs.

Truth table

TC40103BP – IC20, IC24

INPUT CONTROL				OUTPUT MODE
$\overline{\text{CLR}}$ (2)	$\overline{\text{AFE}}$ (9)	$\overline{\text{SPE}}$(15)	$\overline{\text{CI}}$ (3)	
H	H	H	H	Prohibit count
H	H	H	L	Normal count
H	H	L	*	Sync preset
H	L	*	*	Non sync preset
L	*	*	*	Clear

TC4044BP – IC14

R	S	E	Q
		L	HZ
L	L	H	L
L	H	H	L
H	L	H	H
H	H	H	No Change

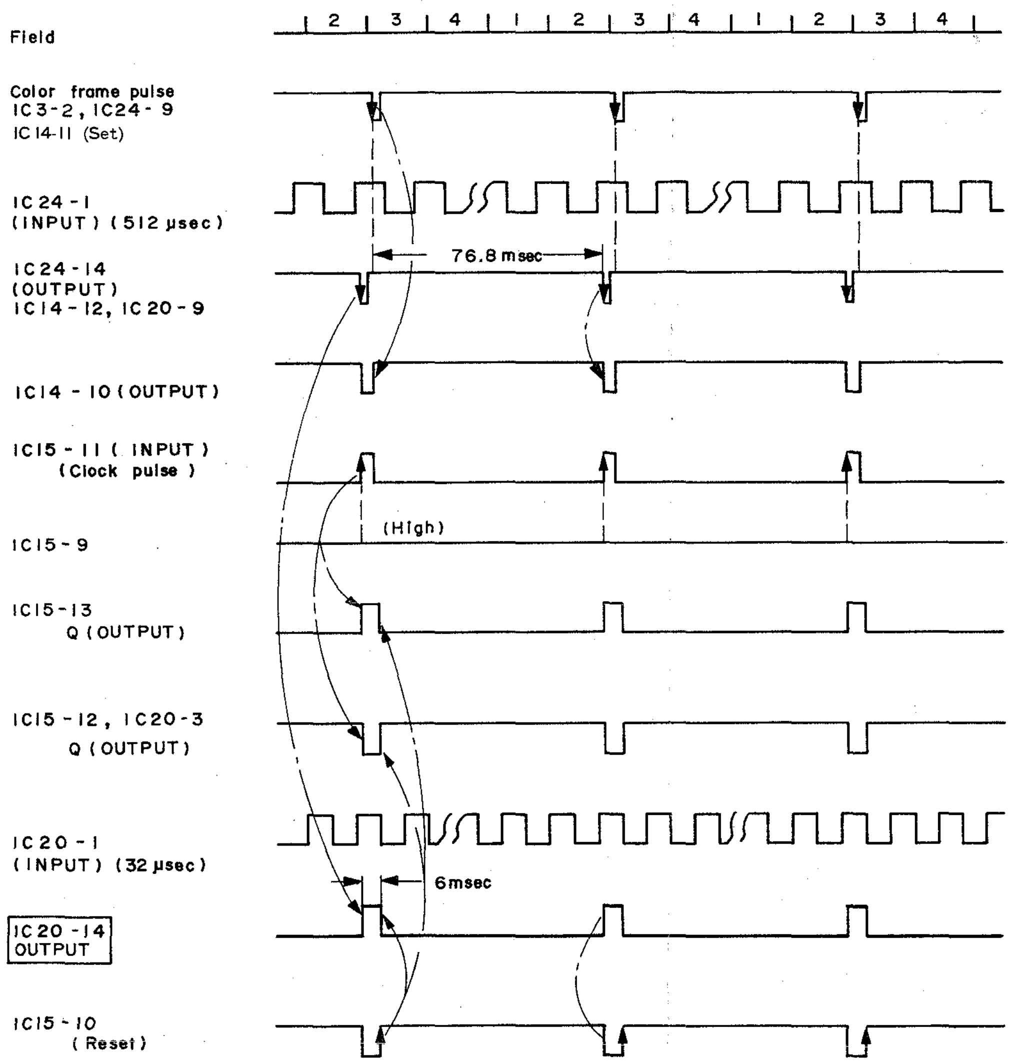
: Don't Care
HZ : High Impedance

TC4013BP – IC15

INPUTS				OUTPUTS	
CL	PR	D	CP△	Q_{n+1}	Q_{n+1}
L	H	*	*	H	L
H	L	*	*	L	H
H	H	*	*	L	H
L	L	L	↑	L	H
L	L	H	↑	H	L
L	L	*	↓	Q_n*	$\overline{Q}_n$*

: Don't Care
△ : Level Change
* : No Change

- Reference pulse
  (color frame warning : IC13, IC14, IC15, IC20, IC24)


Field
2 3 4 1 2 3 4 1 2 3 4
Color frame pulse
IC3-2, IC24-9
IC14-11 (Set)
IC24-1
(INPUT) (512 µsec)
76.8 msec
IC24-14
(OUTPUT)
IC14-12, IC20-9
IC14-10 (OUTPUT)
IC15-11 (INPUT)
(Clock pulse)
(High)
IC15-9
IC15-13
Q (OUTPUT)
IC15-12, IC20-3
Q (OUTPUT)
IC20-1
(INPUT) (32 µsec)
6msec
IC20-14
OUTPUT
IC15-10
(Reset)

- Servo lock
  (color frame v
  IC10 : TC401

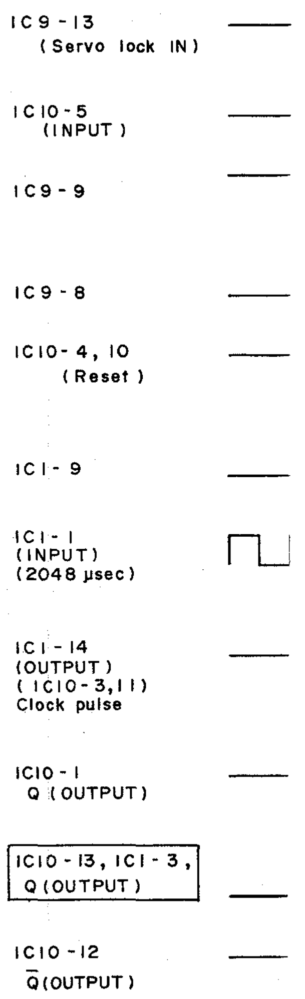
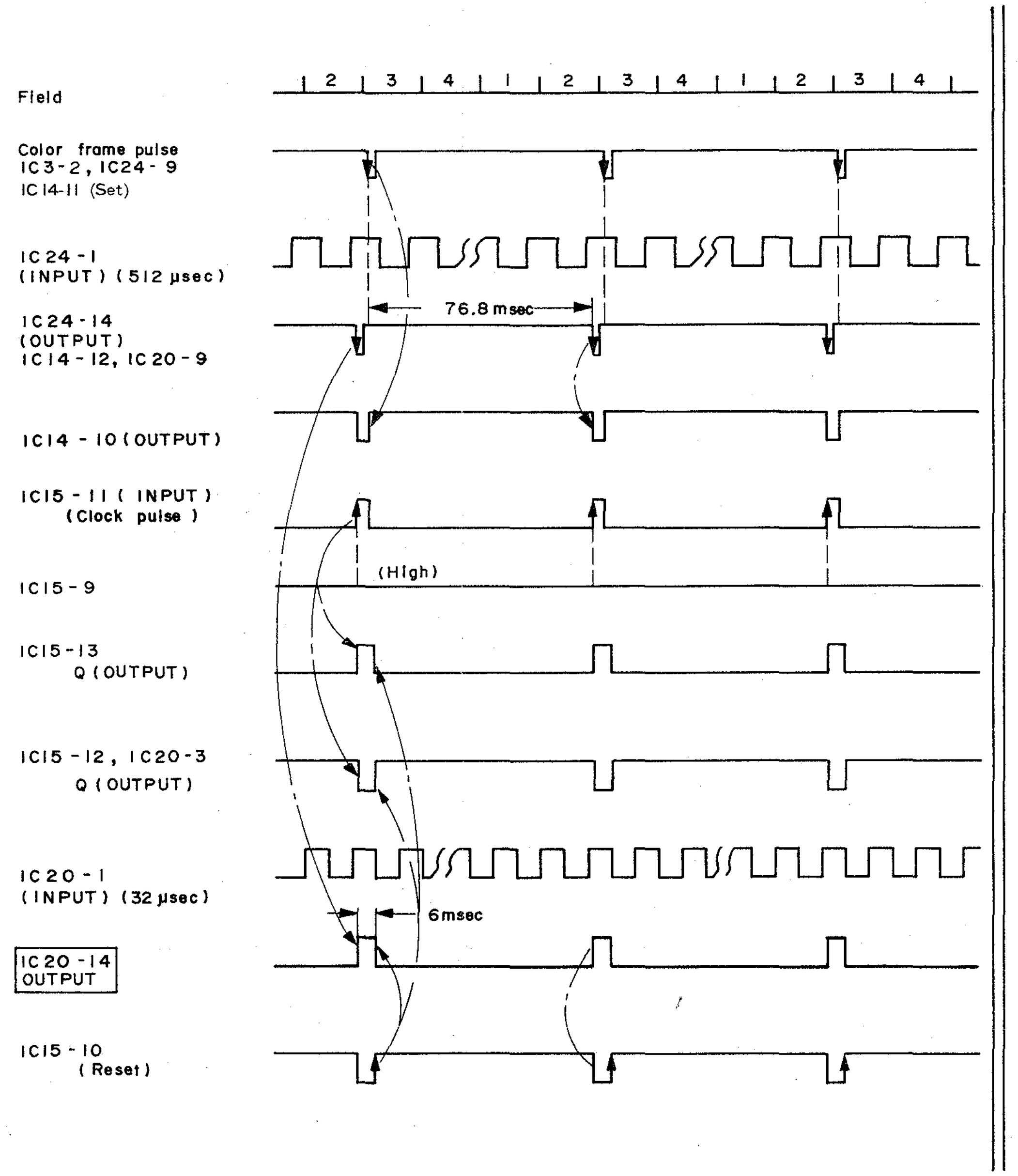

IC9-13
(Servo lock IN)
IC10-5
(INPUT)
IC9-9
IC9-8
IC10-4, 10
(Reset)
IC1-9
IC1-1
(INPUT)
(2048 µsec)
IC1-14
(OUTPUT)
(IC10-3,11)
Clock pulse
IC10-1
Q (OUTPUT)
IC10-13, IC1-3,
Q (OUTPUT)
IC10-12
$\overline{Q}$ (OUTPUT)

Fig. 3-84

- Reference pulse
(color frame warning : IC13, IC14, IC15, IC20, IC24)


Field
1 2 3 4 1 2 3 4 1 2 3 4
Color frame pulse
IC3-2, IC24-9
IC14-11 (Set)
IC24-1
(INPUT) (512 μsec)
76.8 msec
IC24-14
(OUTPUT)
IC14-12, IC20-9
IC14-10 (OUTPUT)
IC15-11 (INPUT)
(Clock pulse)
IC15-9
(High)
IC15-13
Q (OUTPUT)
IC15-12, IC20-3
Q (OUTPUT)
IC20-1
(INPUT) (32 μsec)
6msec
IC20-14
OUTPUT
IC15-10
(Reset)

- Servo lock
(color frame warning : IC1, IC9, IC10, IC13)
IC10 : TC4013BP IC1 : TC40103BP

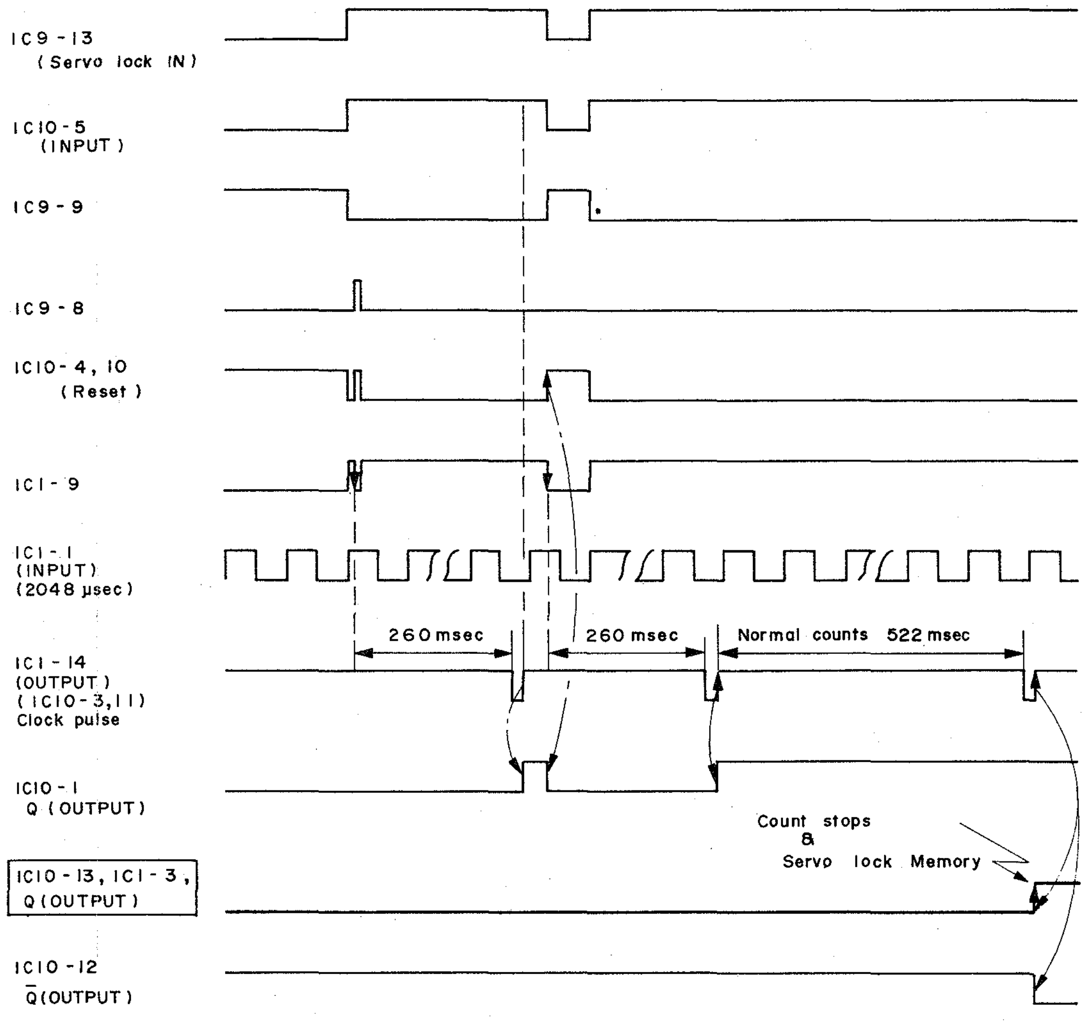

IC9-13
(Servo lock IN)
IC10-5
(INPUT)
IC9-9
IC9-8
IC10-4, 10
(Reset)
IC1-9
IC1-1
(INPUT)
(2048 μsec)
260msec
260 msec
Normal counts 522 msec
IC1-14
(OUTPUT)
(IC10-3,11)
Clock pulse
IC10-1
Q (OUTPUT)
Count stops
&
Servo lock Memory
IC10-13, IC1-3,
Q (OUTPUT)
IC10-12
Q̄ (OUTPUT)

Fig. 3-84

6. Burst Flag, PB color detector, H. phase latch and last color frame pulse latch timing chart.

Truth table

TC4538BP – IC2

INPUT			OUTPUT		NOTE
A_{IN}	B_{IN}	CD	Q	$\overline{Q}$	
↑	H	H	⎍	⎎	OUTPUT ENABLE
↑	L	H	L	H	INHIBIT
H	↓	H	L	H	INHIBIT
L	↓	H	⎍	⎎	OUTPUT ENABLE
*	*	L	L	H	INHIBIT

* : Don't Care

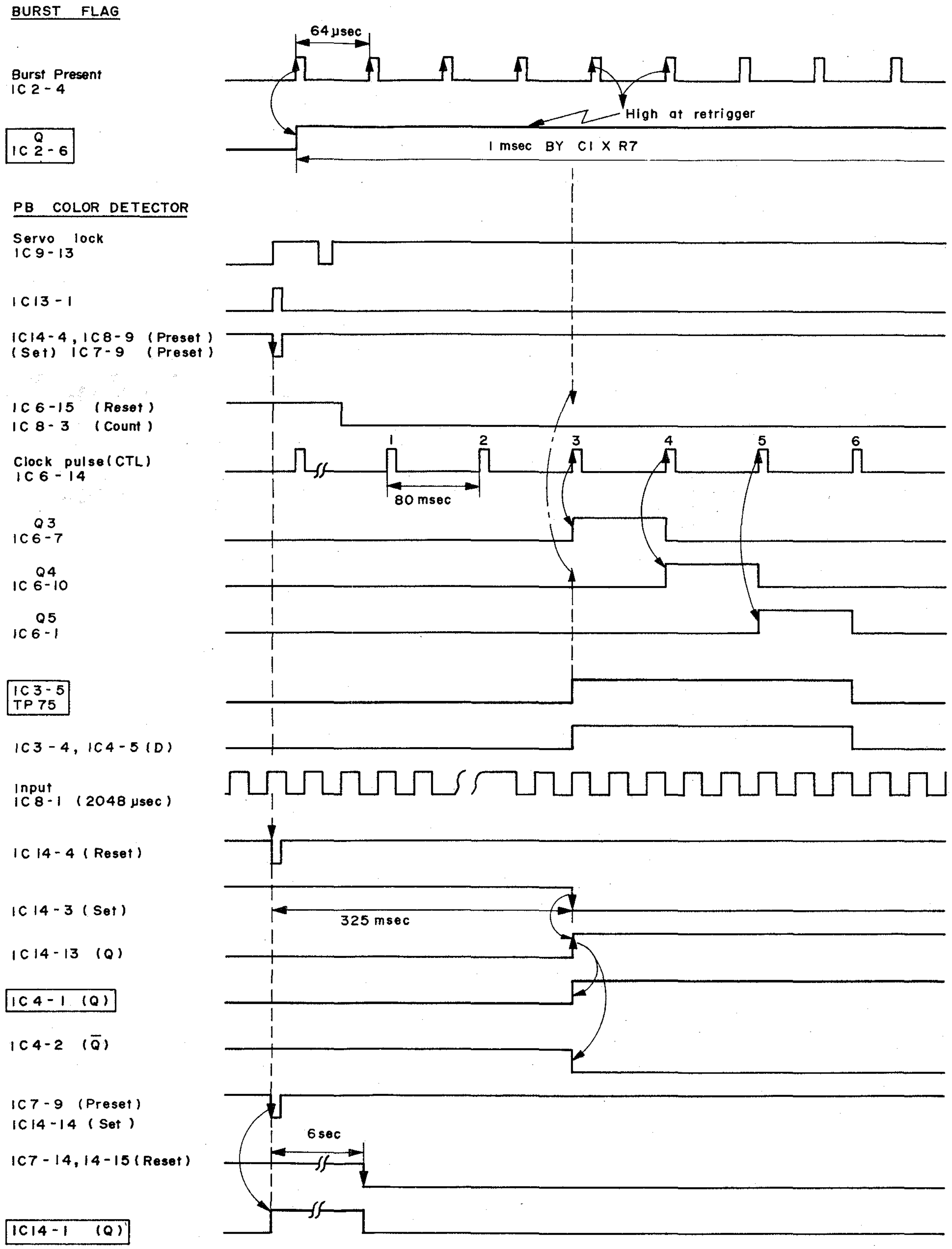
TC4017BP – IC6

INPUTS			SELECTED OUTPUT
CLOCK	$\overline{CE}$	CLEAR	
*	*	H	Q_0
*	H	L	Q_n (NC)
L	*	L	Q_n (NC)
↑	L	L	Q_{n+1}
↓	L	L	Q_n (NC)
H	↑	L	Q_n (NC)
H	↓	L	Q_{n+1}

* : Don't Care
NC : No Change

CARRY OUT 'H'..... $Q_0 \sim Q_4$ = 'H'
'L'..... $Q_5 \sim Q_9$ = 'H'

■ Burst Flag and PB color detector
(color frame warning : IC2, 3, 4, 6, 7, 8, 9, 14)
IC4, 7, 8 : TC40103BP IC14 : TC4044BP


BURST FLAG
64 μsec
Burst Present IC2-4
High at retrigger
Q IC2-6
1 msec BY C1 X R7
PB COLOR DETECTOR
Servo lock IC9-13
IC13-1
IC14-4, IC8-9 (Preset) (Set) IC7-9 (Preset)
IC6-15 (Reset) IC8-3 (Count)
Clock pulse(CTL) IC6-14
1
2
3
4
5
6
80 msec
Q3 IC6-7
Q4 IC6-10
Q5 IC6-1
IC3-5 TP75
IC3-4, IC4-5 (D)
Input IC8-1 (2048 μsec)
IC14-4 (Reset)
IC14-3 (Set)
325 msec
IC14-13 (Q)
IC4-1 (Q)
IC4-2 (Q̄)
IC7-9 (Preset) IC14-14 (Set)
6 sec
IC7-14, 14-15 (Reset)
IC14-1 (Q)

■ H. phase and color frame pulse latch color frame warning : IC3, 12, 14, 15, 18, 19
IC14 : TC4044BP IC15 : TC4013BP

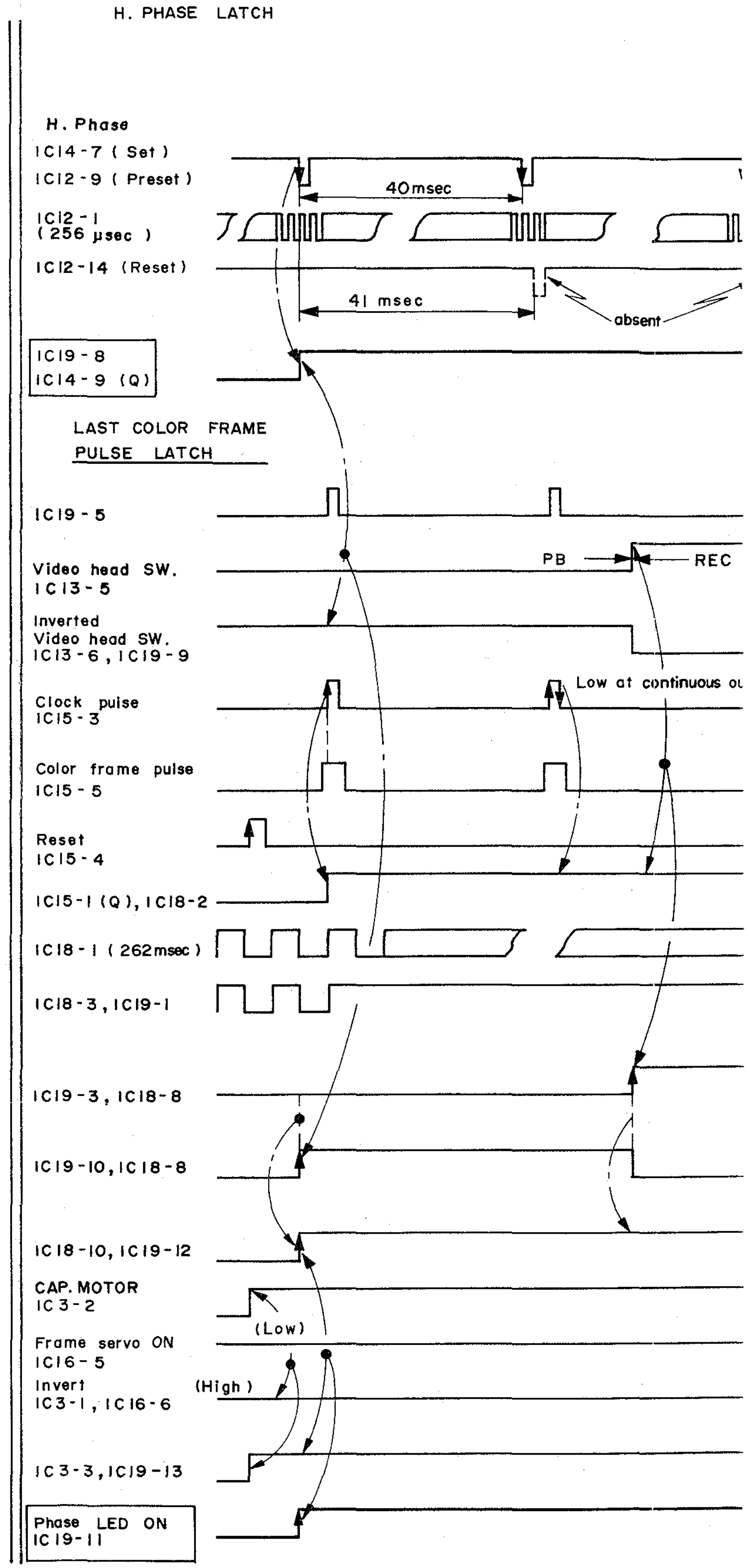
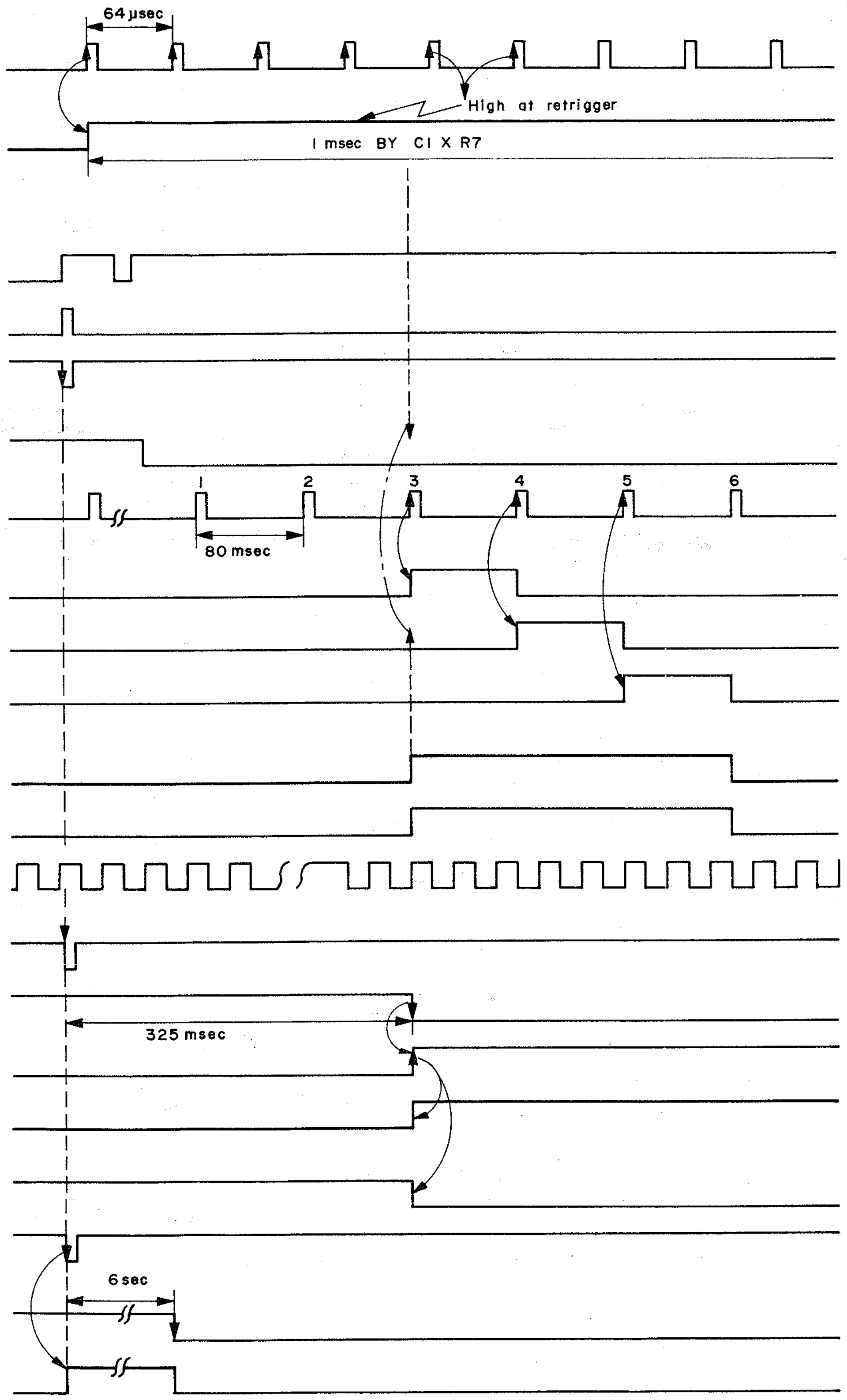

H. PHASE LATCH
H. Phase
IC14-7 (Set)
IC12-9 (Preset)
40msec
IC12-1 (256 μsec)
IC12-14 (Reset)
41 msec
absent
IC19-8
IC14-9 (Q)
LAST COLOR FRAME PULSE LATCH
IC19-5
Video head SW. IC13-5
PB
REC
Inverted Video head SW. IC13-6, IC19-9
Clock pulse IC15-3
Low at continuous ou
Color frame pulse IC15-5
Reset IC15-4
IC15-1 (Q), IC18-2
IC18-1 (262msec)
IC18-3, IC19-1
IC19-3, IC18-8
IC19-10, IC18-8
IC18-10, IC19-12
CAP. MOTOR IC3-2
(Low)
Frame servo ON IC16-5
Invert IC3-1, IC16-6
(High)
IC3-3, IC19-13
Phase LED ON IC19-11

Fig. 3-85

›r detector
IC2, 3, 4, 6, 7, 8, 9, 14)
› IC14 : TC4044BP


64 μsec
High at retrigger
1 msec BY C1 X R7
1
2
3
4
5
6
80 msec
325 msec
6 sec

- H. phase and color frame pulse latch color frame warning : IC3, 12, 14, 15, 18, 19
  IC14 : TC4044BP IC15 : TC4013BP

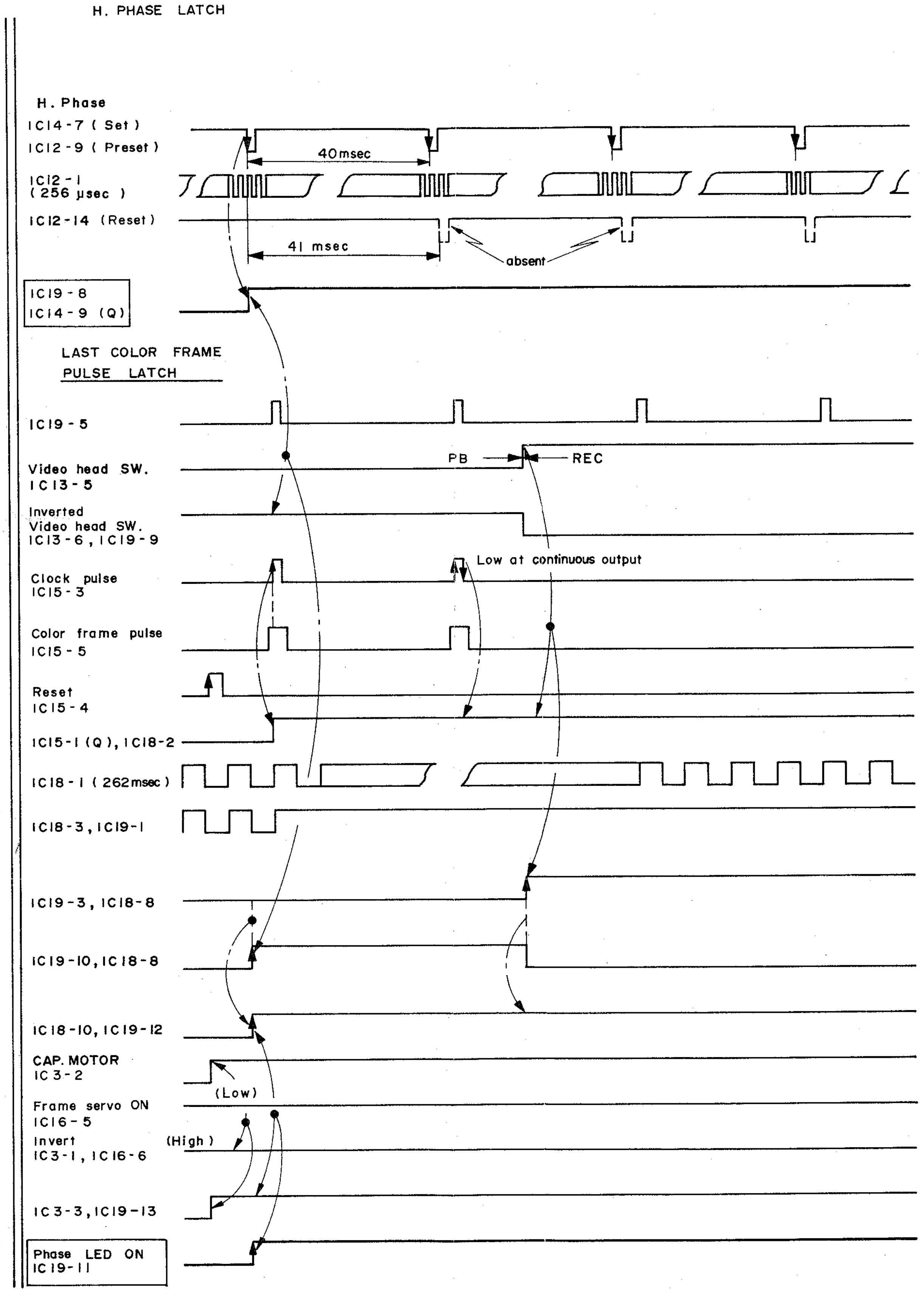

H. PHASE LATCH
H. Phase
IC14-7 (Set)
IC12-9 (Preset)
40 msec
IC12-1 (256 μsec)
IC12-14 (Reset)
41 msec
absent
IC19-8
IC14-9 (Q)
LAST COLOR FRAME PULSE LATCH
IC19-5
PB
REC
Video head SW. IC13-5
Inverted Video head SW. IC13-6, IC19-9
Low at continuous output
Clock pulse IC15-3
Color frame pulse IC15-5
Reset IC15-4
IC15-1 (Q), IC18-2
IC18-1 (262 msec)
IC18-3, IC19-1
IC19-3, IC18-8
IC19-10, IC18-8
IC18-10, IC19-12
CAP. MOTOR IC3-2
(Low)
Frame servo ON IC16-5
Invert IC3-1, IC16-6
(High)
IC3-3, IC19-13
Phase LED ON IC19-11

Fig. 3-85

7. H. phase reference pulse timing chart
Color frame waring (IC11, 16, 17, 21, 22, 23)
IC23 : TC4013BP, IC17,22 : TC40103BP

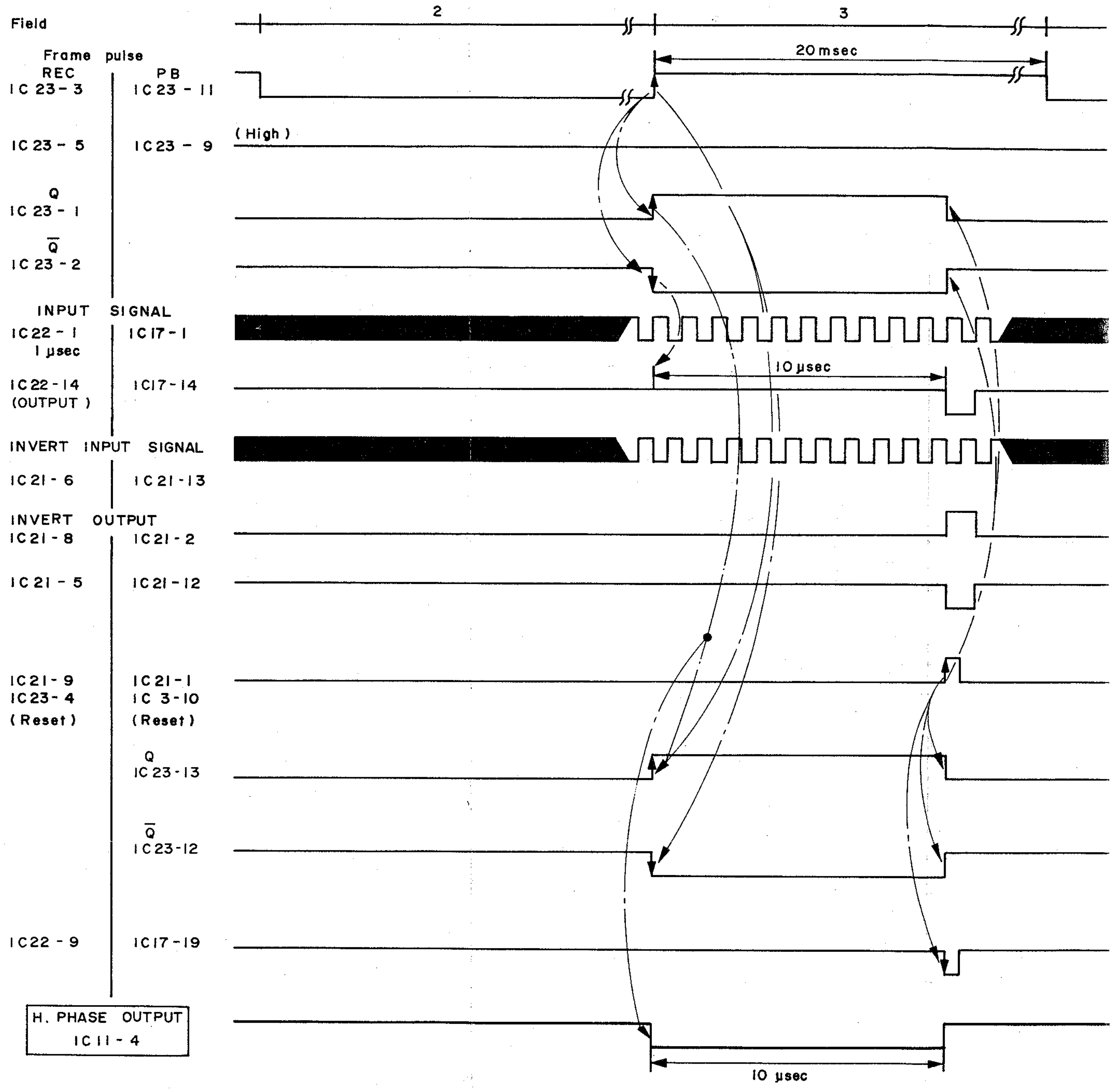

Field
2
3
Frame pulse
REC
IC 23 - 3
PB
IC 23 - 11
20 msec
IC 23 - 5
IC 23 - 9
(High)
Q
IC 23 - 1
Q̅
IC 23 - 2
INPUT SIGNAL
IC22 - 1
1 µsec
IC17 - 1
IC22 - 14
(OUTPUT)
IC17 - 14
10 µsec
INVERT INPUT SIGNAL
IC21 - 6
IC21 - 13
INVERT OUTPUT
IC21 - 8
IC21 - 2
IC21 - 5
IC21 - 12
IC21 - 9
IC23 - 4
(Reset)
IC21 - 1
IC 3 - 10
(Reset)
Q
IC 23 - 13
Q̅
IC 23 - 12
IC22 - 9
IC17 - 19
H. PHASE OUTPUT
IC 11 - 4
10 µsec

Fig. 3-86

7. H. phase reference pulse timing chart
Color frame waring (IC11, 16, 17, 21, 22, 23)
IC23 : TC4013BP, IC17,22 : TC40103BP

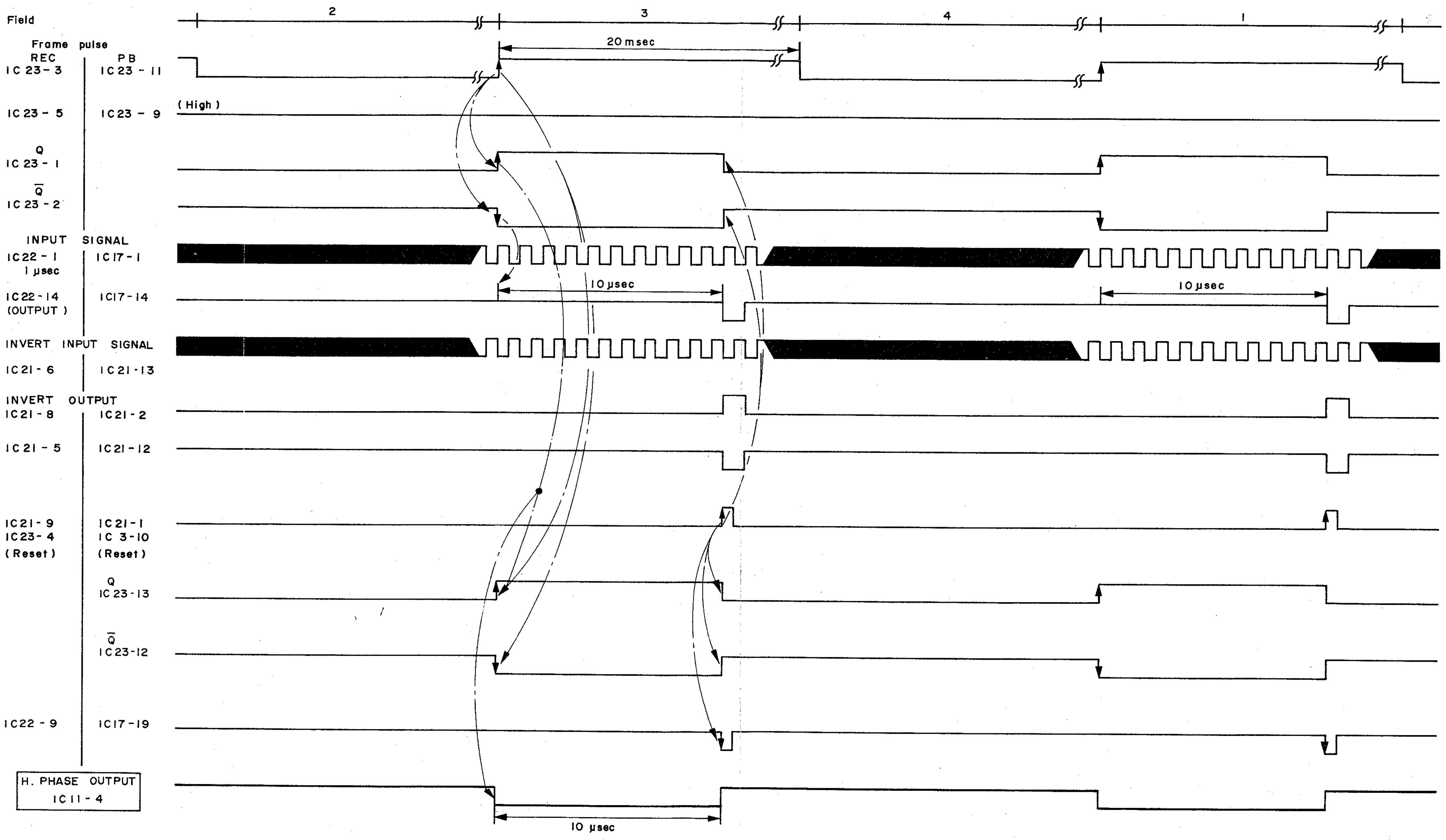
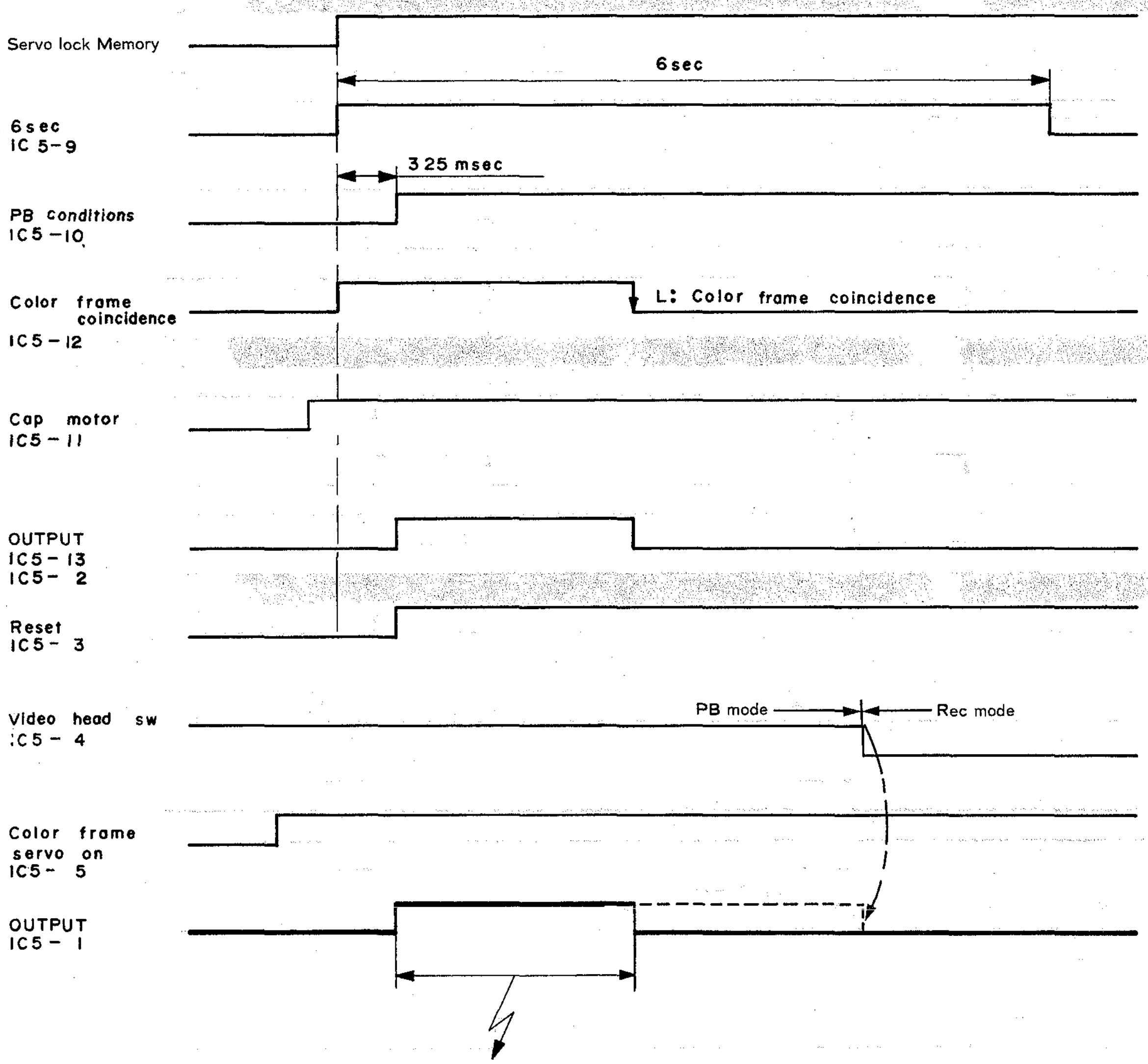

Field
2
3
4
1
Frame pulse
REC
IC 23 - 3
PB
IC 23 - 11
20 msec
IC 23 - 5
IC 23 - 9
(High)
Q
IC 23 - 1
Q̄
IC 23 - 2
INPUT SIGNAL
IC22 - 1
1 µsec
IC17 - 1
10 µsec
IC22 - 14
(OUTPUT)
IC17 - 14
INVERT INPUT SIGNAL
IC21 - 6
IC21 - 13
INVERT OUTPUT
IC21 - 8
IC21 - 2
IC21 - 5
IC21 - 12
IC21 - 9
IC23 - 4
(Reset)
IC21 - 1
IC 3 - 10
(Reset)
Q
IC 23 - 13
Q̄
IC23 - 12
IC22 - 9
IC17 - 19
H. PHASE OUTPUT
IC11 - 4
10 µsec

Fig. 3-86

3-66

8. Color frame gate timing chart
(color frame warning : IC5)


Servo lock Memory
6sec
6sec
IC 5-9
325 msec
PB conditions
IC5-10
Color frame coincidence
IC5-12
L: Color frame coincidence
Cap motor
IC5-11
OUTPUT
IC5-13
IC5-2
Reset
IC5-3
Video head sw
IC5-4
PB mode
Rec mode
Color frame servo on
IC5-5
OUTPUT
IC5-1

TAPE SPEED IS CONTROLLED SO THAT COLOR PHASE OF THE INCOMING SIGNAL COINCIDES WITH THE RECORDED COLOR PHASE

Fig. 3-87

9. Reset timing chart
(color frame servo : IC20, 22, 23)
IC20 : TC4013BP

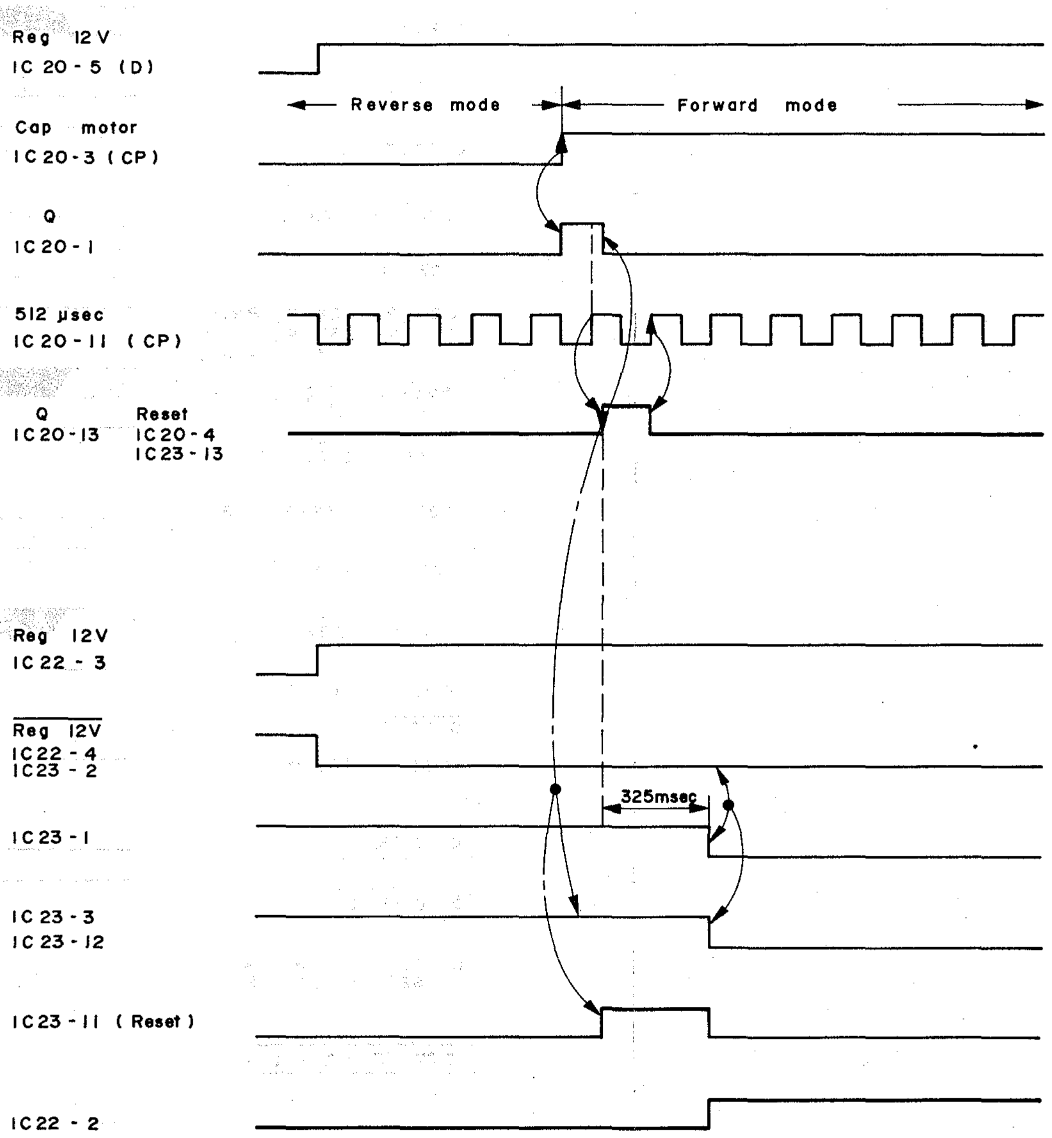

Reg 12V
IC 20-5 (D)
Reverse mode
Forward mode
Cap motor
IC 20-3 (CP)
Q
IC 20-1
512 μsec
IC 20-11 (CP)
Q
IC 20-13
Reset
IC 20-4
IC 23-13
Reg 12V
IC 22-3
Reg 12V
IC 22-4
IC 23-2
325msec
IC 23-1
IC 23-3
IC 23-12
IC 23-11 (Reset)
IC 22-2

Fig. 3-88

10. Incoming video signal timing chart
(color frame servo: IC17, 26, 27, 31, 32, 33, 35)
IC35 : TC4013BP, IC17, 26, 31, 32, 33 : TC40103BP

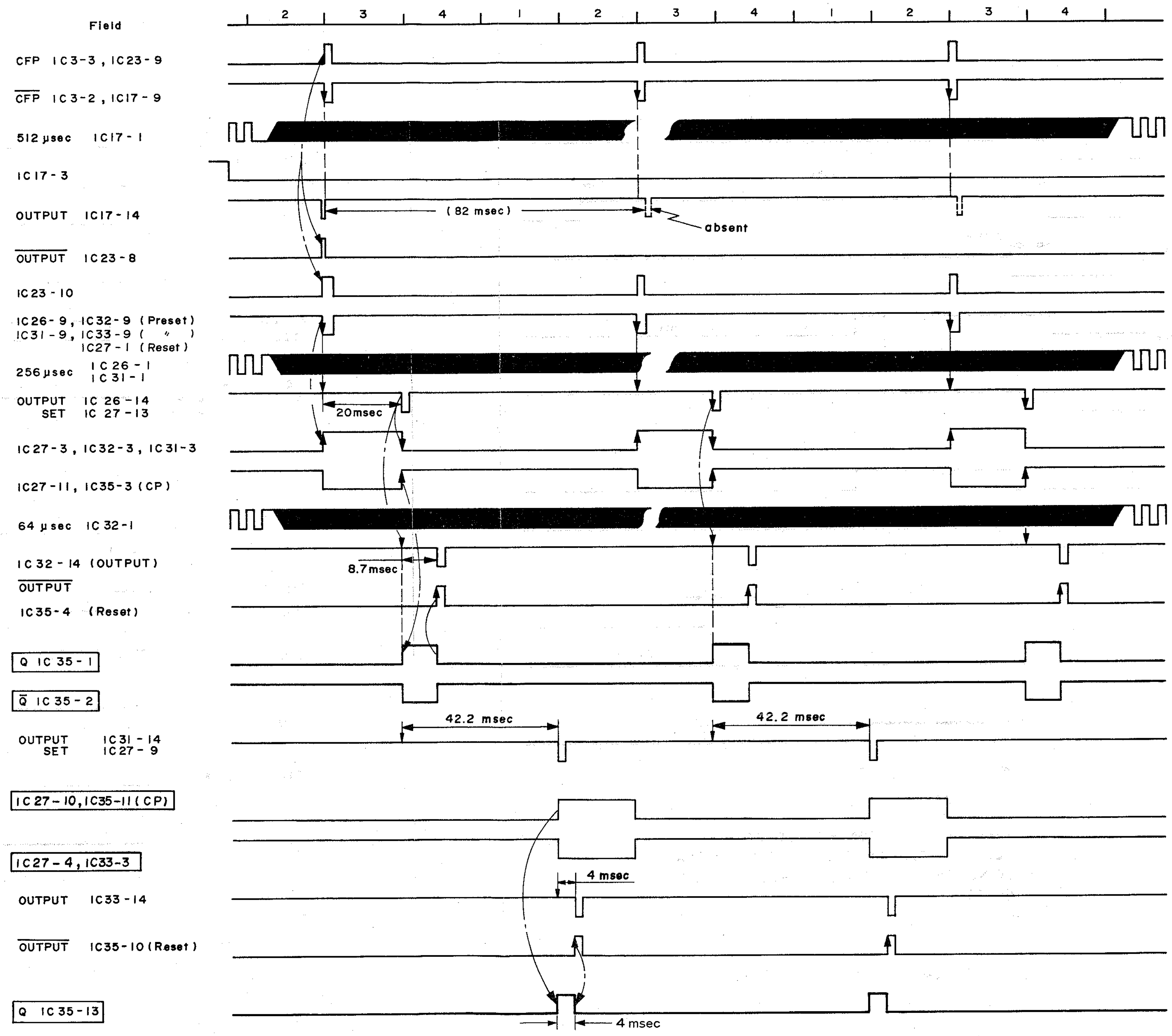

Field
2
3
4
1
2
3
4
1
2
3
4
CFP IC3-3, IC23-9
$\overline{\text{CFP}}$ IC3-2, IC17-9
512 μsec IC17-1
IC17-3
OUTPUT IC17-14
(82 msec)
absent
$\overline{\text{OUTPUT}}$ IC23-8
IC23-10
IC26-9, IC32-9 (Preset)
IC31-9, IC33-9 (")
IC27-1 (Reset)
256 μsec IC26-1
IC31-1
OUTPUT IC 26-14
SET IC 27-13
20msec
IC27-3, IC32-3, IC31-3
IC27-11, IC35-3 (CP)
64 μsec IC 32-1
IC 32-14 (OUTPUT)
8.7msec
$\overline{\text{OUTPUT}}$
IC35-4 (Reset)
Q IC 35-1
$\overline{\text{Q}}$ IC 35-2
42.2 msec
42.2 msec
OUTPUT IC31-14
SET IC27-9
IC 27-10, IC35-11 (CP)
IC27-4, IC33-3
4 msec
OUTPUT IC33-14
$\overline{\text{OUTPUT}}$ IC35-10 (Reset)
Q IC 35-13
4 msec

Fig. 3-89

CFP Color Frame Pulse

11. PB video signal timing chart
(color frame servo : IC16, 18, 19, 23, 24, 25, 29)
IC25 : TC4013BP,   IC16, 18, 19 : TC40103BP

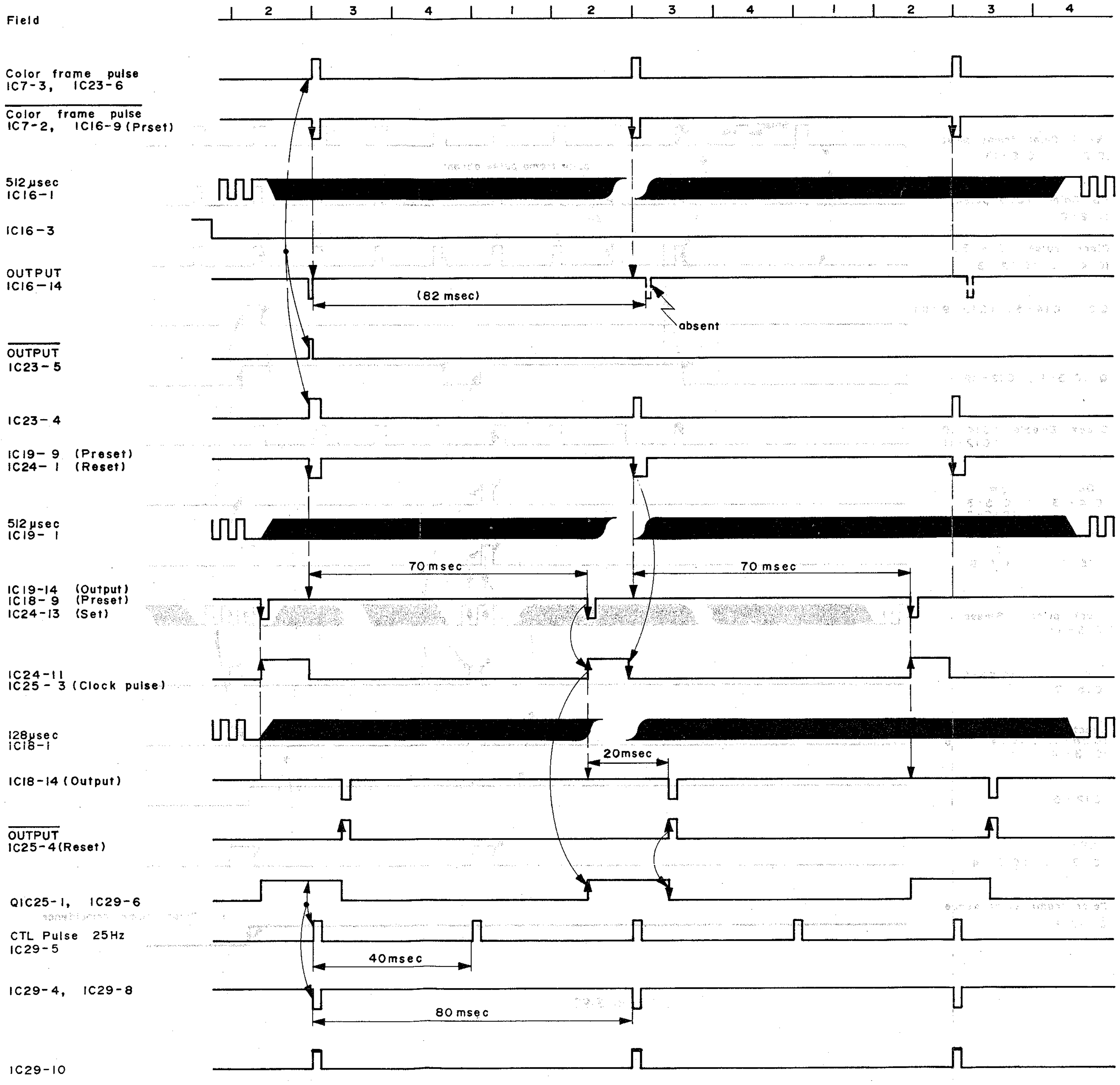


Fig. 3-90

12. Color frame coincidence detector
(color frame servo : IC12, 13, 14, 15, 23, 28)
IC13, 15 : TC4013BP, IC14 : TC4518BP

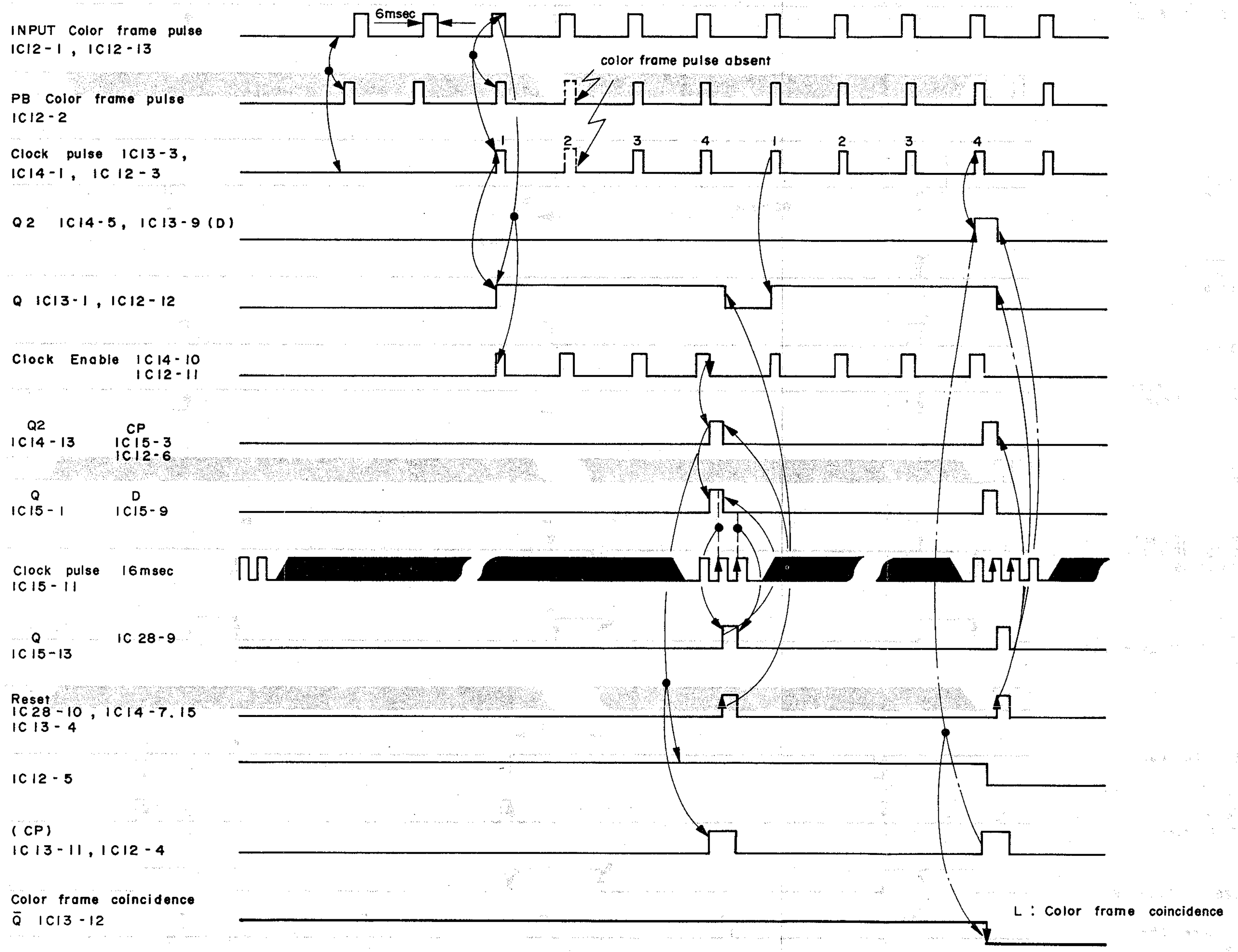

6msec
INPUT Color frame pulse IC12-1 , IC12-13
color frame pulse absent
PB Color frame pulse IC12-2
Clock pulse IC13-3, IC14-1, IC 12-3
1
2
3
4
1
2
3
4
Q2 IC14-5, IC13-9 (D)
Q IC13-1 , IC12-12
Clock Enable IC14-10 IC12-11
Q2 IC14-13
CP IC15-3 IC12-6
Q IC15-1
D IC15-9
Clock pulse 16msec IC15-11
Q IC15-13
IC 28-9
Reset IC28-10 , IC14-7. 15 IC 13-4
IC 12-5
(CP) IC 13-11 , IC12-4
Color frame coincidence Q̄ IC13-12
L : Color frame coincidence

Fig. 3-91

13. Sampling pulse
(color frame servo : IC25, 29, 30, 34)
IC25 : TC4013BP, IC30 : TC40103BP

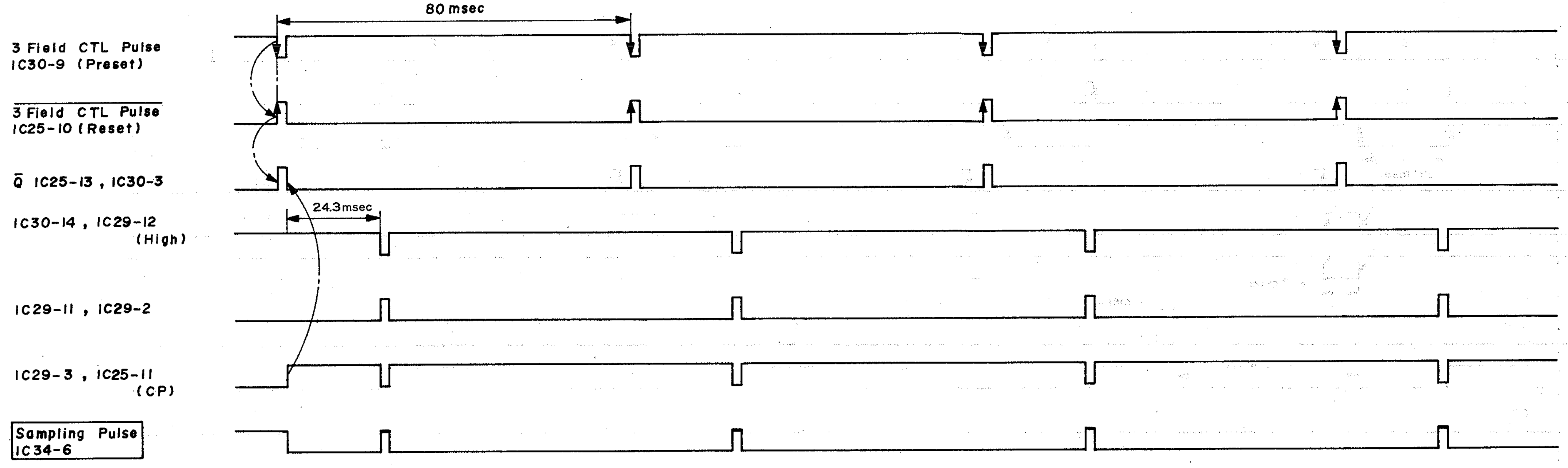

80 msec
3 Field CTL Pulse
IC30-9 (Preset)
3 Field CTL Pulse
IC25-10 (Reset)
Q̄ IC25-13 , IC30-3
24.3msec
IC30-14 , IC29-12
(High)
IC29-11 , IC29-2
IC29-3 , IC25-11
(CP)
Sampling Pulse
IC34-6

Fig. 3-92

14. Sampling and Hold
(color frame servo : IC11, 21, 28)
IC11 : TL094CN, IC21 : TC4066BP

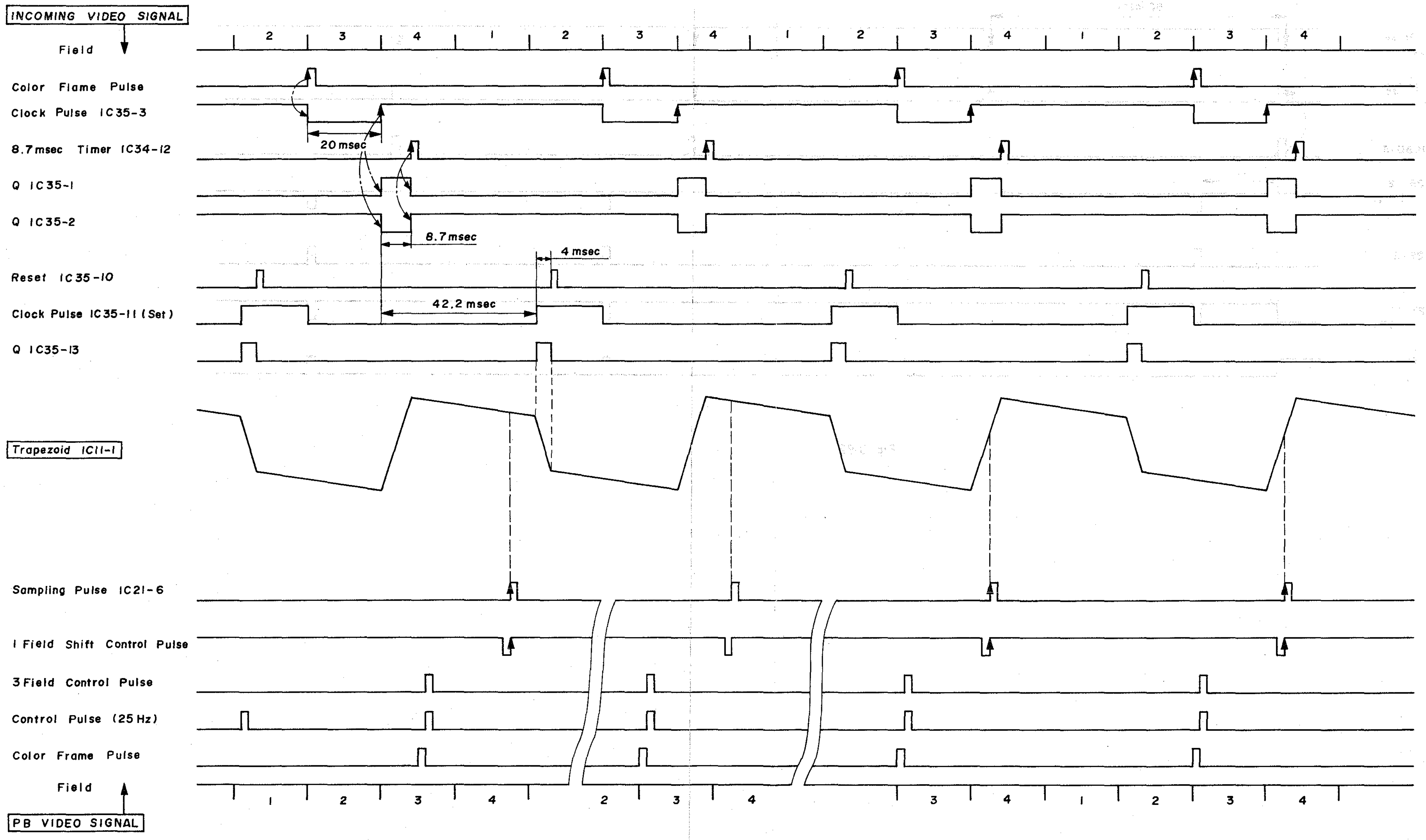
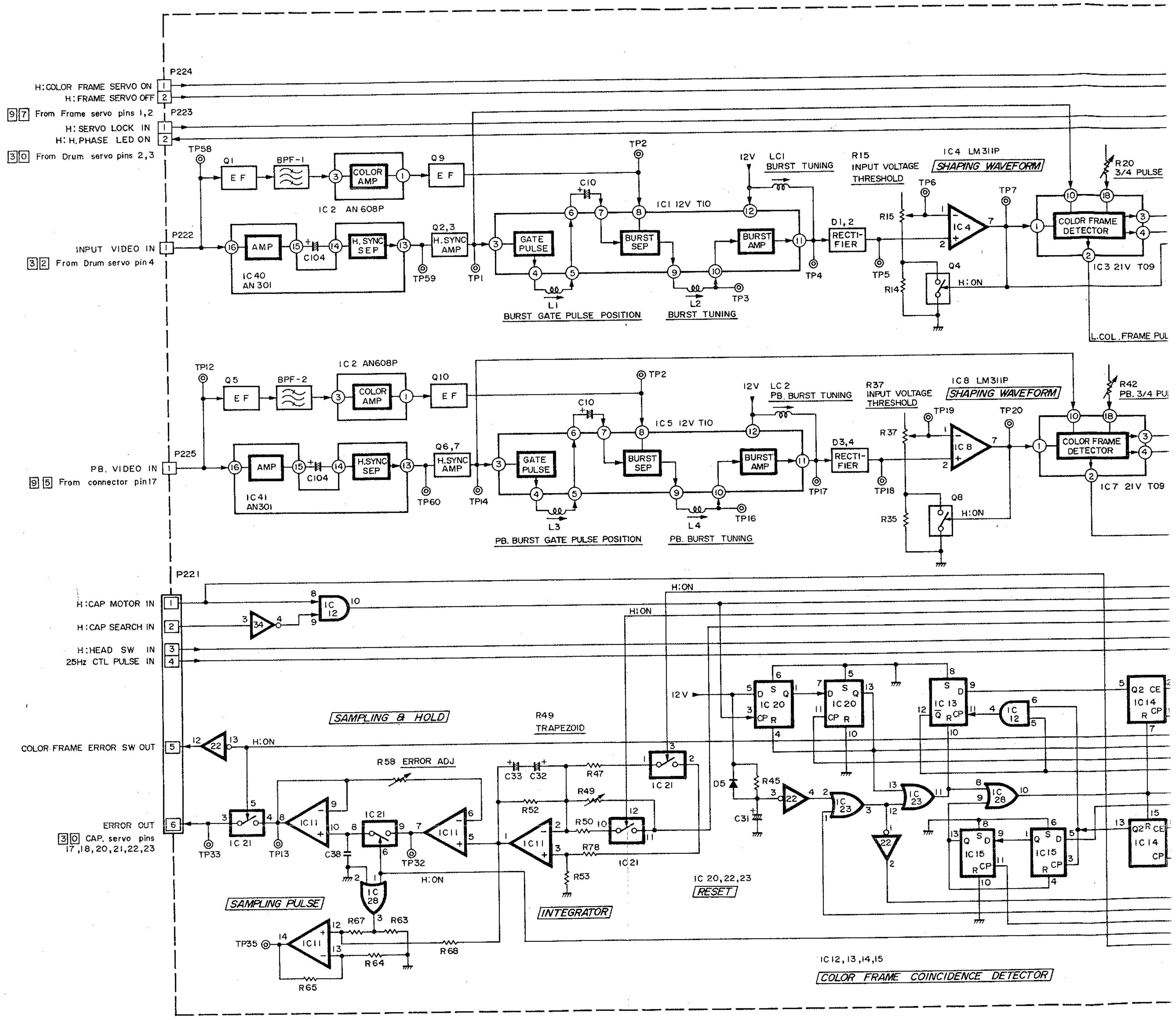

INCOMING VIDEO SIGNAL
Field
2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
Color Flame Pulse
Clock Pulse IC35-3
20 msec
8.7 msec Timer IC34-12
Q IC35-1
Q IC35-2
8.7 msec
4 msec
Reset IC35-10
Clock Pulse IC35-11 (Set)
42.2 msec
Q IC35-13
Trapezoid IC11-1
Sampling Pulse IC21-6
1 Field Shift Control Pulse
3 Field Control Pulse
Control Pulse (25 Hz)
Color Frame Pulse
Field
1 2 3 4 2 3 4 3 4 1 2 3 4
PB VIDEO SIGNAL

Fig. 3-93

3.8.4 Block diagram


P224
H: COLOR FRAME SERVO ON
H: FRAME SERVO OFF
9 7 From Frame servo pins 1,2
P223
H: SERVO LOCK IN
H: H.PHASE LED ON
3 0 From Drum servo pins 2,3
TP58
Q1
E F
BPF-1
COLOR AMP
Q9
IC2 AN608P
P222
INPUT VIDEO IN
3 2 From Drum servo pin 4
AMP
C104
H. SYNC SEP
IC40 AN301
TP59
Q2,3
H.SYNC AMP
TP1
GATE PULSE
C10
IC1 12V T10
BURST SEP
BURST AMP
TP2
TP3
TP4
L1
L2
BURST GATE PULSE POSITION
BURST TUNING
12V
LC1
BURST TUNING
D1,2
RECTI-FIER
TP5
R15
INPUT VOLTAGE THRESHOLD
TP6
IC4 LM311P
SHAPING WAVEFORM
IC4
TP7
Q4
R14
H: ON
R20
3/4 PULSE
COLOR FRAME DETECTOR
IC3 21V T09
L.COL. FRAME PUL
TP12
Q5
BPF-2
IC2 AN608P
Q10
P225
PB. VIDEO IN
9 5 From connector pin17
IC41 AN301
TP60
Q6,7
TP14
C10
IC5 12V T10
L3
L4
TP16
TP17
PB. BURST GATE PULSE POSITION
PB. BURST TUNING
LC2
PB. BURST TUNING
D3,4
TP18
R37
INPUT VOLTAGE THRESHOLD
IC8 LM311P
SHAPING WAVEFORM
TP19
TP20
IC8
Q8
R35
R42
PB. 3/4 PU
IC7 21V T09
P221
H: CAP MOTOR IN
H: CAP SEARCH IN
H: HEAD SW IN
25Hz CTL PULSE IN
IC 12
34
H: ON
12V
IC 20
IC 13
IC 12
Q2 CE
IC14
SAMPLING & HOLD
R49
TRAPEZOID
COLOR FRAME ERROR SW OUT
22
R58 ERROR ADJ
C33
C32
R47
R52
R49
R50
R78
R53
IC 21
D5
R45
C31
IC 23
IC 28
IC 15
ERROR OUT
3 0 CAP. servo pins 17,18,20,21,22,23
IC 21
IC11
TP33
TP13
C38
TP32
IC 28
SAMPLING PULSE
INTEGRATOR
IC 20,22,23
RESET
TP35
R67
R63
R64
R68
R65
IC12,13,14,15
COLOR FRAME COINCIDENCE DETECTOR

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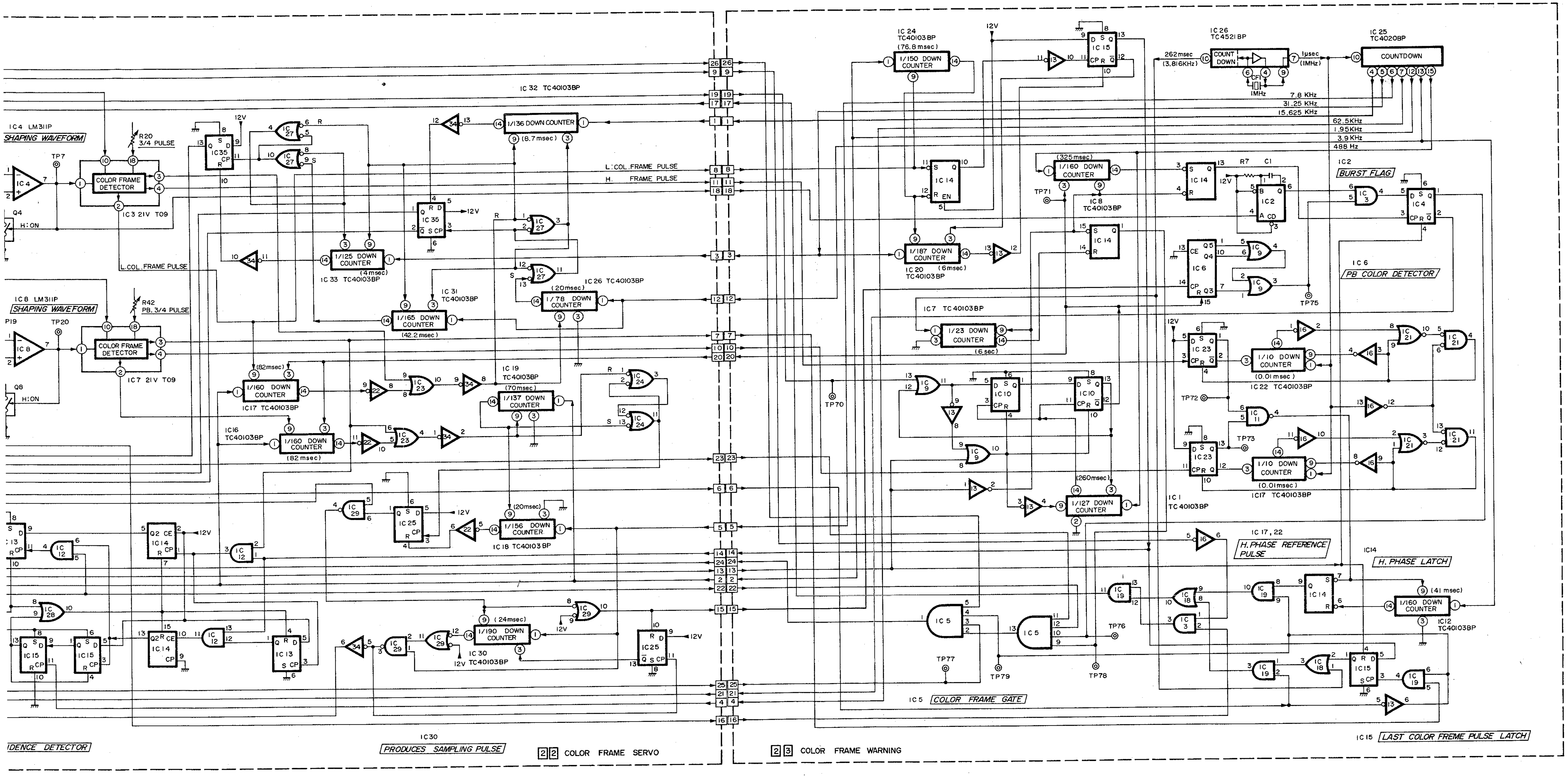

IC4 LM311P
SHAPING WAVEFORM
R20 3/4 PULSE
TP7
COLOR FRAME DETECTOR
IC3 21V T09
Q4
H:ON
IC8 LM311P
SHAPING WAVEFORM
R42 PB. 3/4 PULSE
TP20
IC7 21V T09
Q8
L.COL. FRAME PULSE
IC35
IC 32 TC40103BP
1/136 DOWN COUNTER
(8.7msec)
L.COL.FRAME PULSE
H. FRAME PULSE
1/125 DOWN COUNTER
(4msec)
IC 33 TC40103BP
IC 31 TC40103BP
1/165 DOWN COUNTER
(42.2msec)
1/78 DOWN COUNTER
(20msec)
IC 26 TC40103BP
(82msec)
1/160 DOWN COUNTER
IC17 TC40103BP
IC16 TC40103BP
(82msec)
IC 19 TC40103BP
(70msec)
1/137 DOWN COUNTER
IC25
(20msec)
1/156 DOWN COUNTER
IC 18 TC40103BP
IC14
IC12
IC13
IC15
IC28
IC29
(24msec)
1/190 DOWN COUNTER
IC 30 TC40103BP
12V
IDENCE DETECTOR
IC30
PRODUCES SAMPLING PULSE
2 2 COLOR FRAME SERVO
IC 24 TC40103BP
(76.8msec)
1/150 DOWN COUNTER
IC 15
IC 26 TC4521BP
262msec (3.816KHz)
COUNT DOWN
CF1 1MHz
1μsec (1MHz)
IC 25 TC4020BP
COUNTDOWN
7.8 KHz
31.25 KHz
15.625 KHz
62.5KHz
1.95KHz
3.9 KHz
488 Hz
IC 14
(325msec)
1/160 DOWN COUNTER
IC 8 TC40103BP
TP71
R7 C1
IC2
BURST FLAG
IC 4
1/187 DOWN COUNTER
(6msec)
IC 20 TC40103BP
IC 6
PB COLOR DETECTOR
TP75
IC7 TC40103BP
1/23 DOWN COUNTER
(6sec)
IC 23
1/10 DOWN COUNTER
(0.01msec)
IC 22 TC40103BP
TP70
IC 10
TP72
TP73
IC17 TC40103BP
(260msec)
1/127 DOWN COUNTER
IC 1 TC40103BP
IC 17, 22
H. PHASE REFERENCE PULSE
IC14
H. PHASE LATCH
(41 msec)
1/160 DOWN COUNTER
IC12 TC40103BP
IC 5
TP76
TP77
TP79
TP78
IC 5 COLOR FRAME GATE
IC15 LAST COLOR FREME PULSE LATCH
2 3 COLOR FRAME WARNING

Fig. 3-94

3-74 Clear

SECTION 4
MECHANICAL ADJUSTMENT

4.1 GENERAL

The adjustments described in this section are those which can be performed by a qualified service technician. Those which require highly specialized equipment and training (such as replacement of the lower drum) are omitted.

Proper maintenance and inspection are important both for ensuring top performance and preventing damage to the tape. Note that the required jigs must be employed when specified in the adjustment steps.

4.1.1 Precautions

IMPORTANT

1. Always turn the power off before removing or soldering components.
2. When removing a screw from the chassis, be careful not to drop it into the mechanism. If a screw should be dropped, be sure to retrieve it.
3. Be extremely careful not to damage either the upper or lower head drum assemblied.
4. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
5. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the guide poles and rotary video head drum.)
6. To check the mechanism without the cassette tape, lock the cassette pin. Also disable the photo transistor sensors by applying opaque covers. After completing checks and repairs, be sure to remove the covers.
7. Tighten the screws carefully to avoid damage to the cabinet.

4.1.2 Required jigs and tools

The special jigs and tools listed below are required in order to perform the mechanical adjustments correctly in accordance with the adjustment procedures.

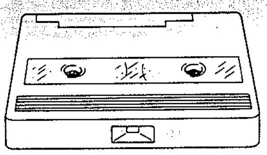
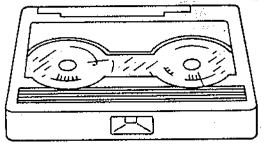
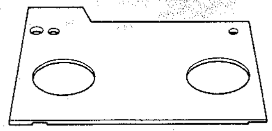
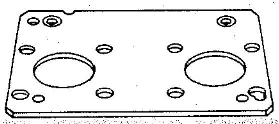
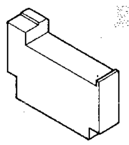
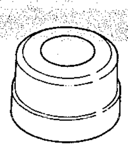
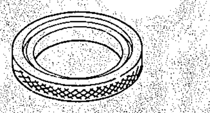
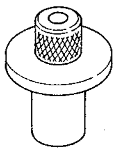
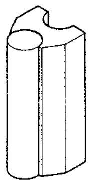
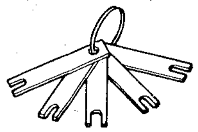
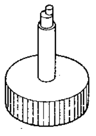
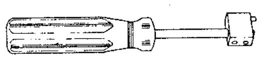
JVC alignment tape MO-2B, MO-2SB/MORE-S	Torque meter PUJ42373	Master plane jig PUJ36524
		
Reel positioning jig PUJ36103	Height gauge PUJ43780	Cassette compartment positioning jig PUJ42150
		
Reel disk height jig PUJ42151	Reel motor positioning jig PUJ42152	V-notch check jig PUJ36281
		
Thickness gauge PUJ48017	Eccentric pin PUJ46250	CTL head positioning jig PUJ47032
		

Table 4-1

4.2 DISASSEMBLY

4.2.1 External covers

1. Take out 2 screws ① and remove the top cover in the rearward direction.

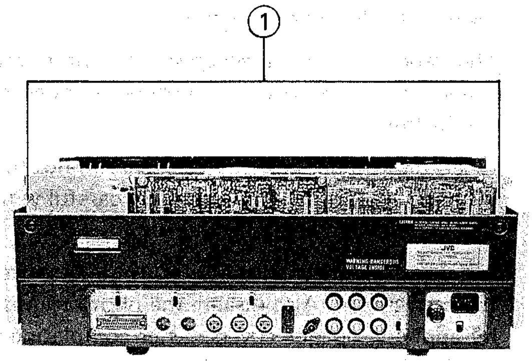


Fig. 4-1

2. Take out 4 screws ② and remove the rear panel.

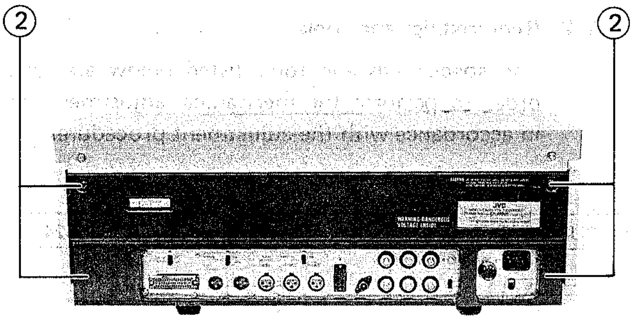


Fig. 4-2

3. Each side panel can be removed by taking out 2 screws ③.

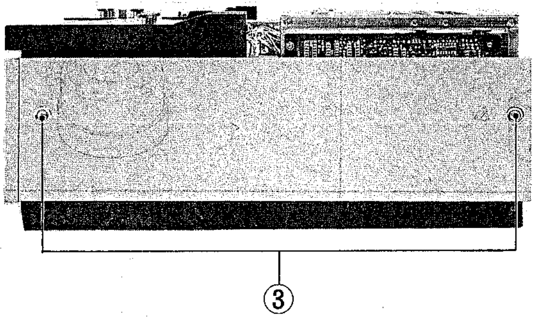


Fig. 4-3

4. Take out 2 screws each, left and right, ④ and remove the front panel.

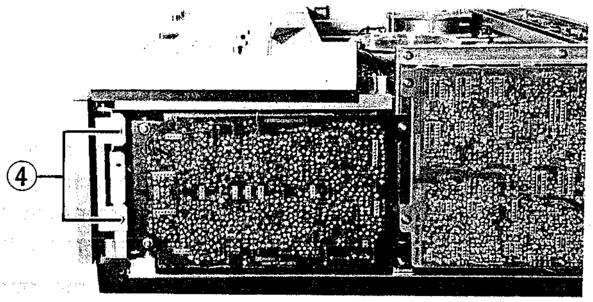


Fig. 4-4

5. Take out 4 screws ⑤ and remove the bottom panel.

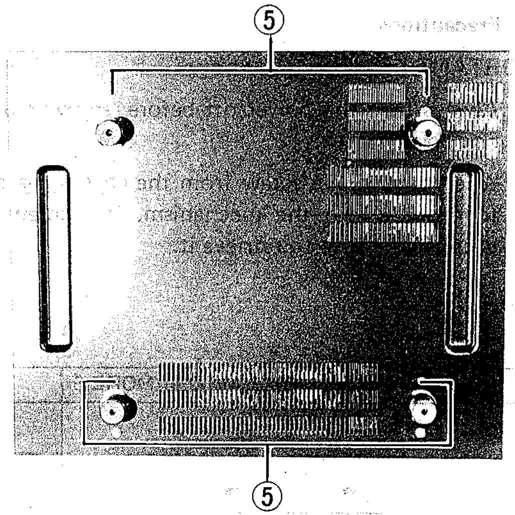


Fig. 4-5

6. If necessary to remove the cassette compartment, perform with the compartment in the raised state. Take out 4 screws ⑥ and while using care regarding the rod Ⓐ, lift the compartment toward the left and remove.

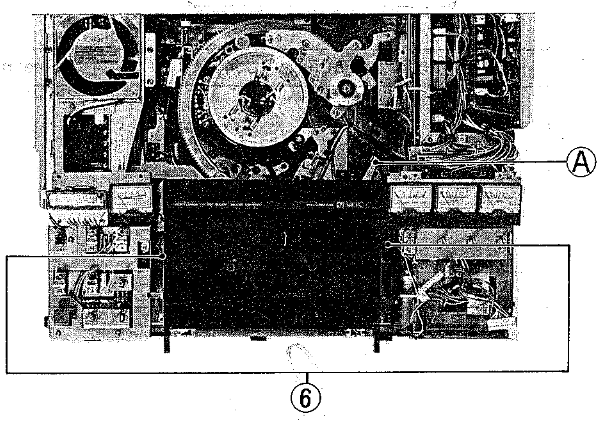
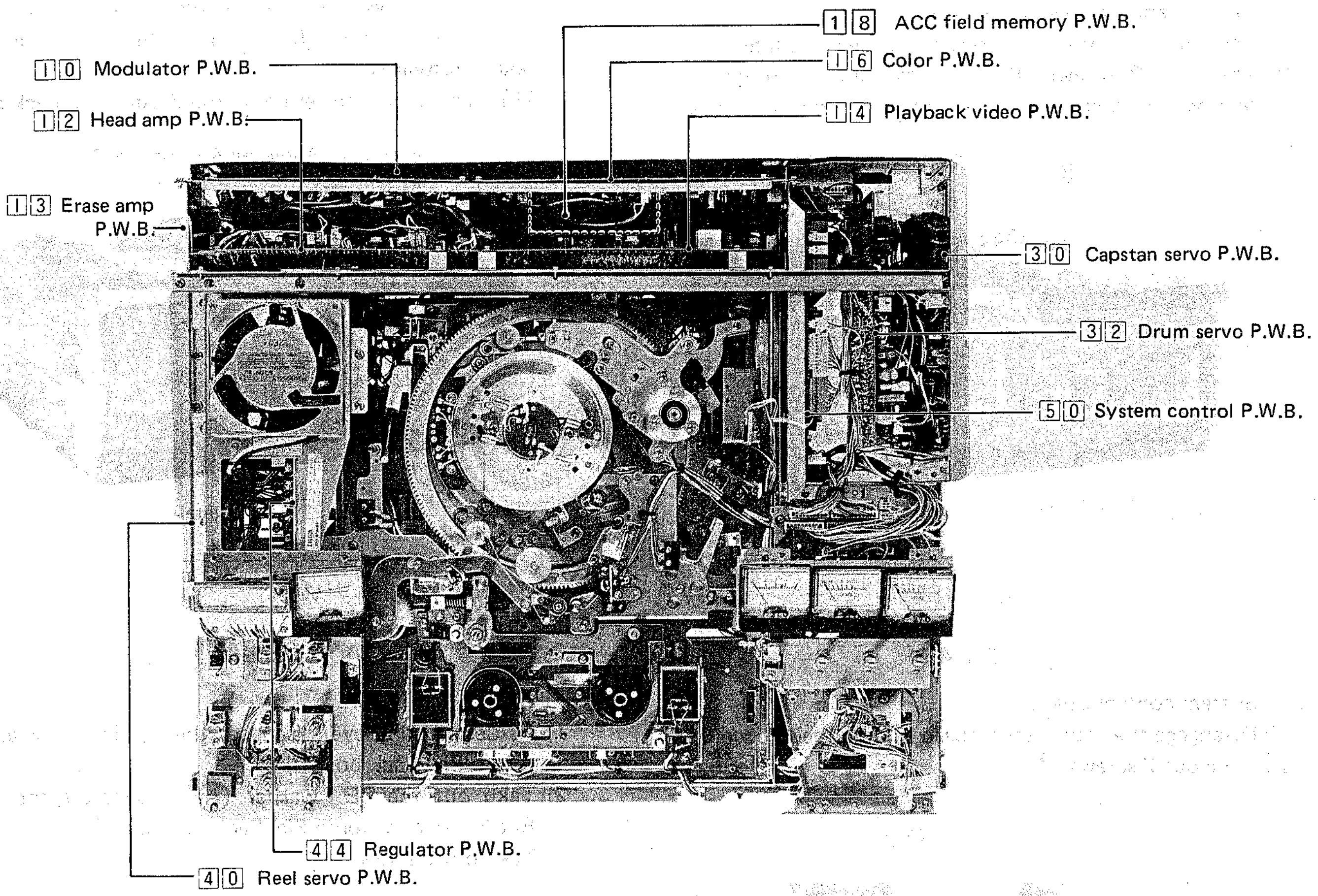


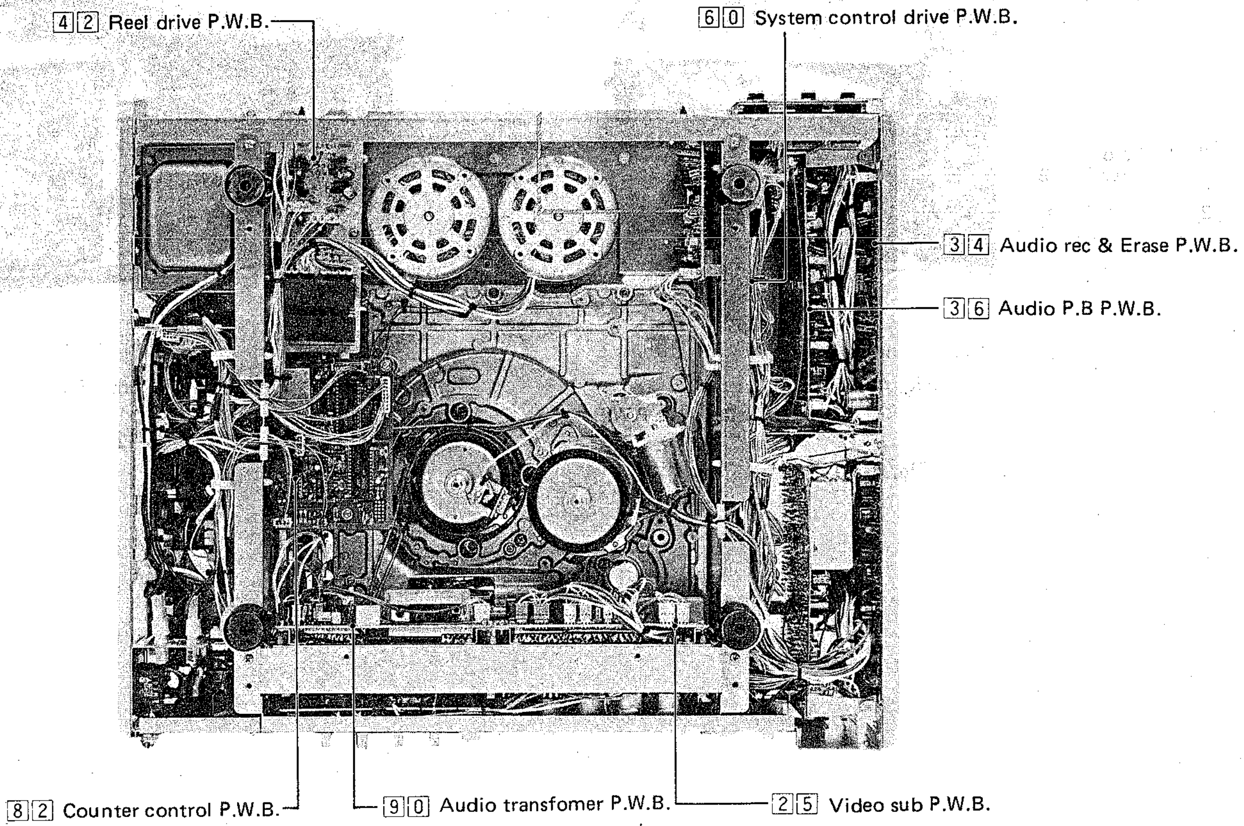
Fig. 4-6

4.2.2 Main circuit board



18 ACC field memory P.W.B.
10 Modulator P.W.B.
16 Color P.W.B.
12 Head amp P.W.B.
14 Playback video P.W.B.
13 Erase amp P.W.B.
30 Capstan servo P.W.B.
32 Drum servo P.W.B.
50 System control P.W.B.
44 Regulator P.W.B.
40 Reel servo P.W.B.

Fig. 4-7 Top view



42 Reel drive P.W.B.
60 System control drive P.W.B.
34 Audio rec & Erase P.W.B.
36 Audio P.B P.W.B.
82 Counter control P.W.B.
90 Audio transfomer P.W.B.
25 Video sub P.W.B.

Fig. 4-8 Bottom view

4.2.3 Circuit board access

1. Capstan and drum servo boards
   1) Take out 2 screws Ⓐ and remove the side plate.
   2) Take out 2 screws Ⓑ. The capstan and drum servo boards can then be pulled outward from the chassis.

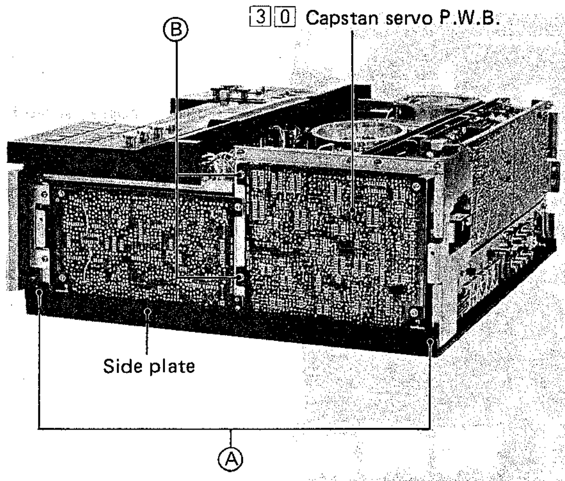

Ⓑ
30 Capstan servo P.W.B.
Side plate
Ⓐ

Fig. 4-9

2. System control board
   1) Disengage the drum servo board as described above.
   2) Take out 2 screws Ⓐ.

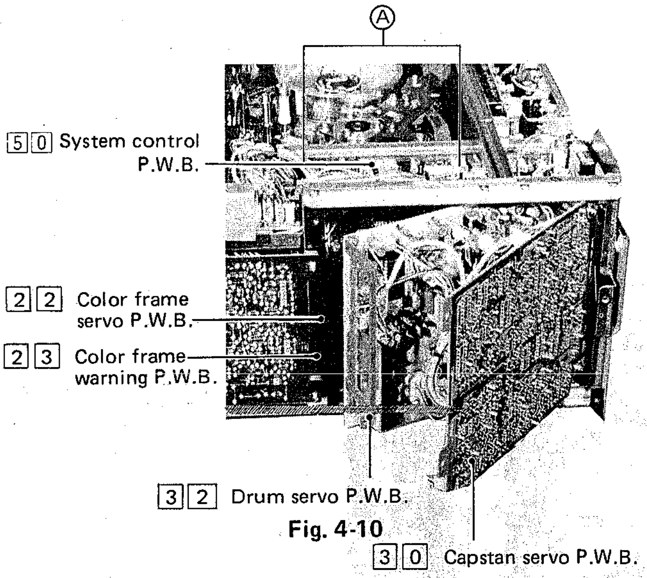

Ⓐ
50 System control P.W.B.
22 Color frame servo P.W.B.
23 Color frame warning P.W.B.
32 Drum servo P.W.B.
Fig. 4-10
30 Capstan servo P.W.B.

Fig. 4-10

3. Audio Rec/Erase and Audio Playback boards
   1) Take out 2 screws Ⓐ and remove the side plate.
   2) Take out 2 screws Ⓑ and pull the Audio Rec/Erase board outwards.
   3) This simultaneously extracts the Audio Playback board.

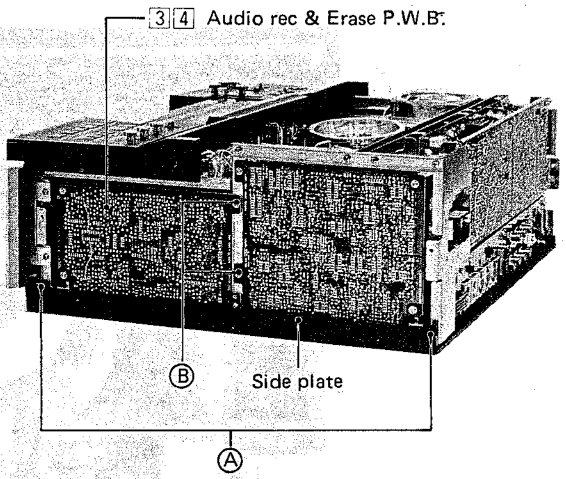

34 Audio rec & Erase P.W.B.
Ⓑ
Side plate
Ⓐ

Fig. 4-11

4. Syscon drive board
   1) As described above, disengage the Audio Rec/Erase and Audio Playback boards.
   2) Take out the "E" washer Ⓐ to separate the Audio Rec/Erase and Audio Playback boards.
   3) Take out 2 screws Ⓑ.

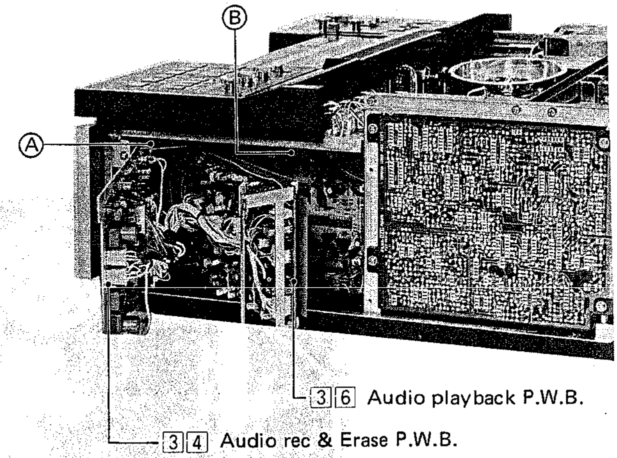

Ⓑ
Ⓐ
36 Audio playback P.W.B.
34 Audio rec & Erase P.W.B.

Fig. 4-12

5. Modulator and Color boards

1) Take out 2 screws Ⓐ, then pull the modulator and Color boards outward.

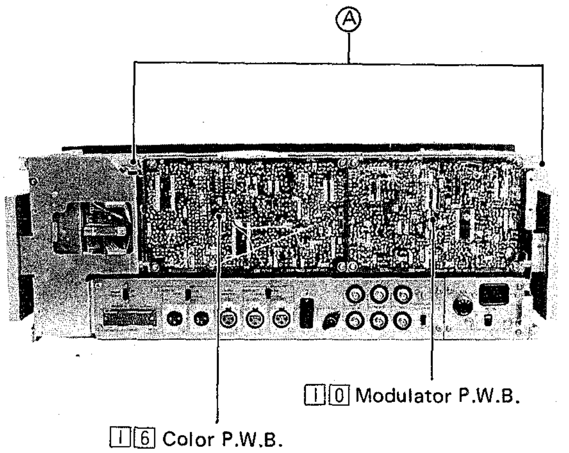

Ⓐ
10 Modulator P.W.B.
16 Color P.W.B.

Fig. 4-13

6. Playback video and Head amplifier boards

1) As described above, extract the modulator and Color boards.
2) Take out 2 screws Ⓐ and pull the Playback video board outward.
3) Take out 2 screws Ⓑ and pull the Head amplifier board outward.

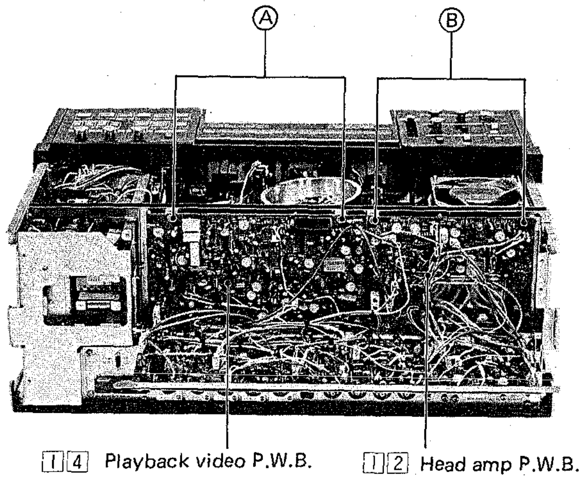

Ⓐ
Ⓑ
14 Playback video P.W.B.
12 Head amp P.W.B.

Fig. 4-14

7. Reel servo and Video erase boards

1) Take out 2 screws Ⓐ and pull the Reel servo board outward.
2) Take out 2 screws Ⓑ and pull the Video erase board outward.

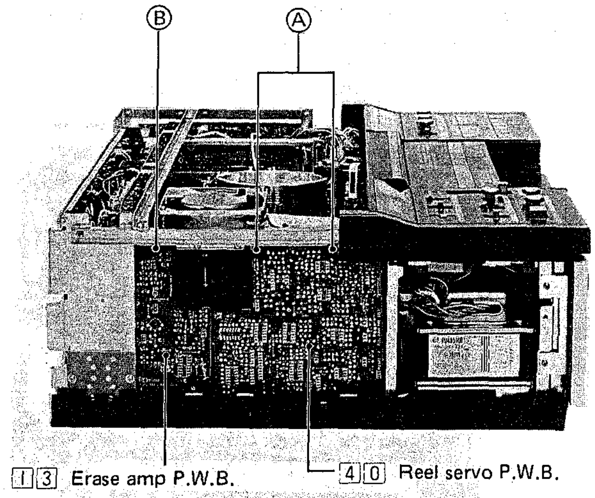

Ⓑ
Ⓐ
13 Erase amp P.W.B.
40 Reel servo P.W.B.

Fig. 4-15

8. Regulator board

1) As described above, extract the Reel servo board.
2) Take out screw Ⓐ and pull the Regulator board outward.

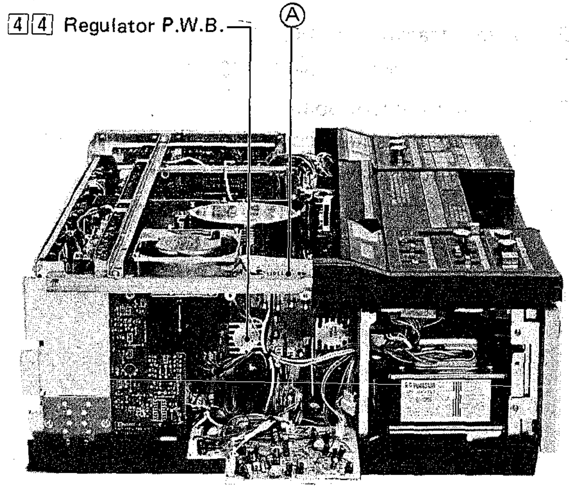

44 Regulator P.W.B.
Ⓐ

Fig. 4-16

9. Reel drive board
   1) Take out 2 screws Ⓐ. (Fig. 4-17)

10. Time code board
   1) Take out 2 screws Ⓑ. (Fig. 4-17)

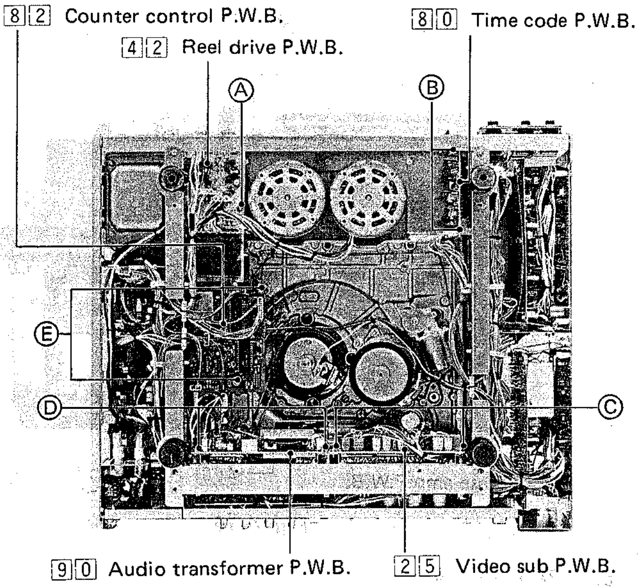

82 Counter control P.W.B.
42 Reel drive P.W.B.
80 Time code P.W.B.
Ⓐ
Ⓑ
Ⓔ
Ⓓ
Ⓒ
90 Audio transformer P.W.B.
25 Video sub P.W.B.

Fig. 4-17

11. Video sub-board
   1) Take out 2 screws Ⓒ. (Fig. 4-17)

12. Audio transformer board
   1) Take out 2 screws Ⓓ. (Fig. 4-17)

13. Counter control board
   1) Remove the shield cover from the counter control board.
   2) Take out 2 screws Ⓔ. (Fig. 4-17)

4.3 PERIODIC MAINTENANCE AND CHECKING

The following procedures have been devised as a basic guide for maintaining this video cassette recorder in optimum performance and reliability during operation.

4.3.1 Layout of mechanical components

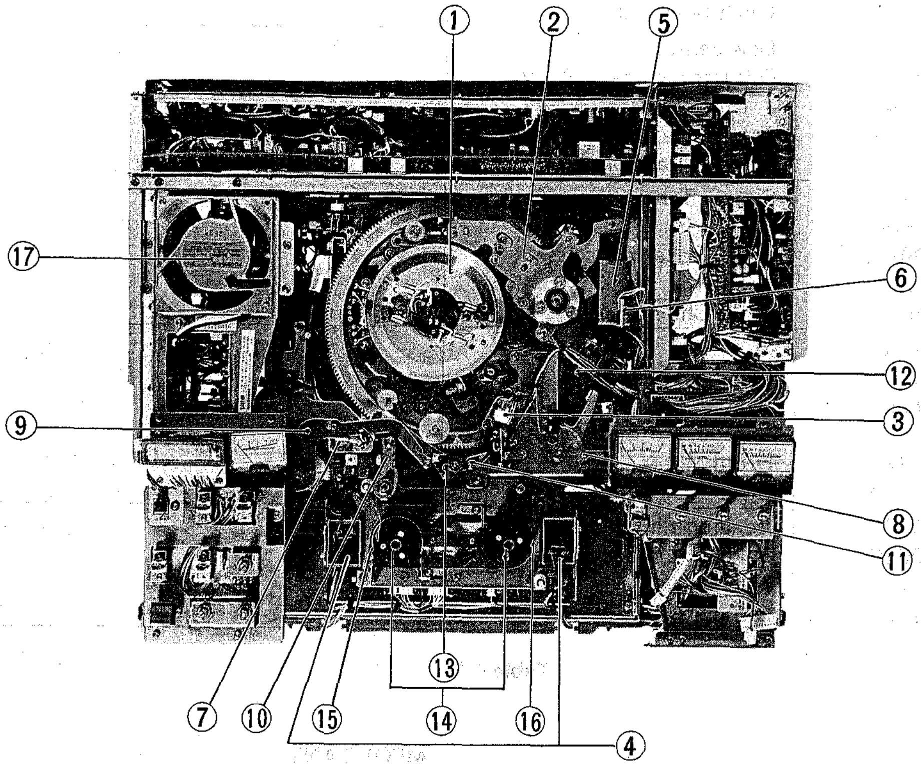


Fig. 4-18 Top view

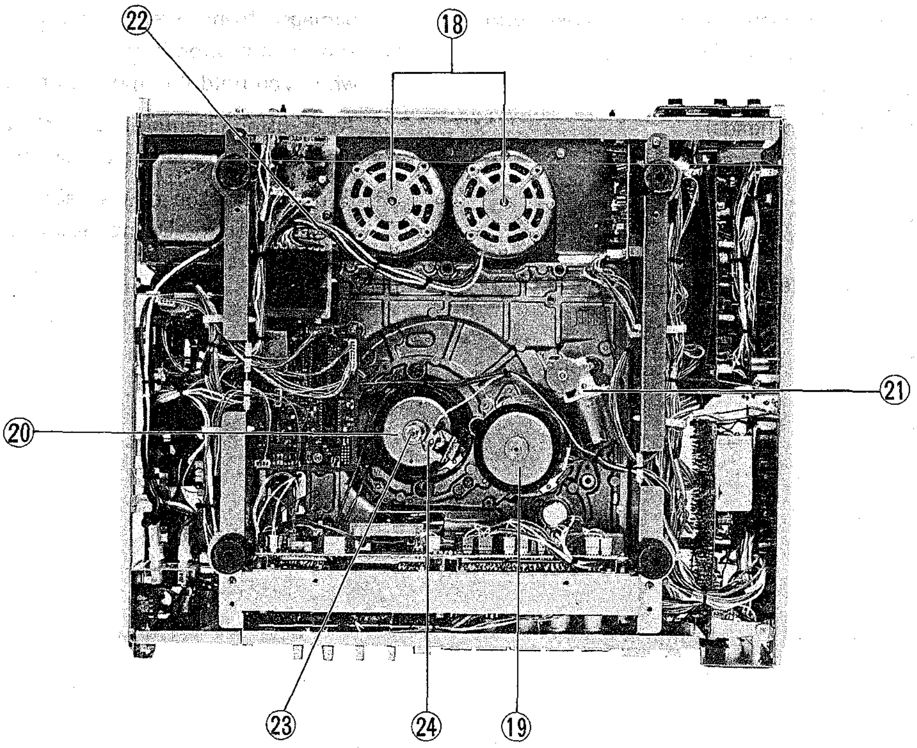


Fig. 4-19 Bottom view

Symbol No.	Part No.	Part Name	Description
1	PU33682J	Upper Drum Ass'y	CR-8250E
	PU33682K	"	CR-6650E, CP-5550E
2	PU48589A	Audio/Control Head Ass'y	CR-8250E, CR-6650E
	PU48590A	"	CP-5550E
3	PU43980	Full Erase Head	
4	PU48447	Brake Solenoid	
5	PU48329	Pinch Solenoid	
6	PU50570	Dew Sensor	
7	PU48591A	Differential Trans. Ass'y	
8	PU48592A	"	
9	PUS46161B	Take-up Loading Arm Ass'y	
10	PU55028A	Take-up Tension Arm Ass'y	
11	PU53904A-1	Supply Tension Arm Ass'y	
12	PUS46150B	Ring Drive Gear Ass'y	
13	PU33709A-2	Pinch Roller Arm Ass'y	
14	PU32416B	Reel Disk	
15	PU48446-1-1	Brake Shoe	
16	PU48446-2	"	
17	PU46564-3	Fan Motor	
18	M574-00C	Reel Motor	
19	PU53929	Capstan Motor	
20	PUS25887-E	Drum Motor	CR-8250E Incl. Lower Drum Ass'y
	" -F	"	CR-6650E, CP-5550E Incl. "
21	PUS36063C	Loading Ring Motor Ass'y	
22	PUS36060C	Take-up Loading Arm Motor Ass'y	
23	PU48074A	Ring Ass'y	
24	PU41827C	Brush Ass'y	

Table 4-2

4.3.2 Cleaning

For cleaning, use a lint-free, fine textured cotton cloth or gauze moistened with alcohol solvent after every 500 hours of use. Use a cotton swab moistened with cleaning fluid to clean the spots out of easy reach.

A: Tape transport system
1. Upper drum (includes video heads)
2. Lower drum
3. Capstan
4. Audio/Control head
5. Full erase head
6. Tape guides (poles and rollers)

B: Drive system
7. Ring guides rollers
8. Supply reel disk
9. Take-up reel disk

C: Others
10. Photo
11. Dew sensor
12. Brushes
13. Ring ass'y

IMPORTANT

1. When cleaning the video head on the upper drum, do not wipe it in vertical strokes because the head is easily damaged from external pressure. Use only a gentle back and forth motion in the same direction as the tape travel, while you hold the upper drum with one hand.
2. After using cleaning liquid, allow the parts to dry completely before loading a cassette tape.
3. Gently clean the dew sensor along the direction of the surface pattern. Do not touch the surface directly with your fingers.

4.3.3 Main assembly replacement

The following chart lists the parts which should receive periodic servicing at recommended intervals. Please note that the intervals are calculated on standard usage and may therefore vary more or less. Inadequate practice of periodic checking or maintenance may lead to reduced durability while negatively affecting the performance of other parts. Rubber parts left unused or stored for a long duration of time may deform or degrade.

Classification	Part No.	Part Name	500 H	1,000 H	1,500 H	2,000 H	2,500 H	3,000 H	Description
HEAD	PU33682J	Upper Drum Ass'y	○	○	○	○	○	○	CR-8250E
	PU33682K	"	○	○	○	○	○	○	CR-6650E
	PU48589A	Audio/Control Head Ass'y	☆	☆	☆	○	☆	☆	
	PU48590A	"	☆	☆	☆	○	☆	☆	CP-5550E
	PU43980	Full Erase Head	☆	☆	☆	○	☆	☆	
MOTOR	PU53929	Capstan Motor							4,000 H
	PUS25887-E	Lower Drum Ass'y	☆	☆	☆	☆	☆	☆	
	PUS25887-F	"	☆	☆	☆	☆	☆	☆	
	PUS36060C	Take-up Loading Arm Motor Ass'y				○			
	PUS36063C	Loading Ring Motor Ass'y				○			
	PUS36064B	Compartment Motor Ass'y				○			
	M574-00C	Take-up Reel Motor							4,000 H
	M574-00C	Supply Reel Motor							4,000 H
GEAR	PUS46150B	Ring Drive Gear Ass'y				○			
BRAKE	PUS48446-1-1	Brake Shoe		□		○			Confirm the stroke at checking up the solenoid.
	PUS48446-2			□		○			
IDLER	PU33709A-2	Pinch Roller Arm Ass'y	☆	○	☆	○	☆	○	
SOLENOID	PU48329	Pinch Solenoid		□		□		○	Check
	PU48447	Brake Solenoid		□		□		○	Change the direction of the plunger or replace the solenoid, if necessary.
REEL FG	GP-1A01	Photo Interrupter	☆	☆	☆	☆	☆	☆	2 pcs.
ROLLER	PU48314	Ring Guide Roller	☆	☆	☆	☆	☆	○	
BRUSH	PU48047A	Ring Ass'y	☆	○	☆	○	☆	○	
	PU41827C	Brush Ass'y	☆	○	☆	○	☆	○	
DAMPER	PU48383	Damper (DP-1)	☆△	☆△	☆△	☆△	☆△	☆△	Apply the grease indicated.
	PU48384	" (DP-2)	☆△	☆△	☆△	☆△	☆△	☆△	
METER	PU49133	Hour Meter	It is recommended to replace it when the video head is replaced.						

○ : Replacement   △ : Lubrication   ☆ : Cleaning   □ : Checkup (Replace, if necessary.)

Table 4-3 Standard servicing periods

4.4 REPLACEMENT PROCEDURES OF MAIN PARTS

4.4.1 Upper drum

Replacement steps

1. Unsolder the 4 white wires from the erase head terminal board (perform quickly to avoid overheating).
2. Remove the 2 screws Ⓐ and dismount the erase head terminal board.
3. Unsolder the 4 black wires from the video head terminal board.
4. Unscrew the 2 screws Ⓑ, and disengage the wire clamps to dislodge the upper drum by lifting it upwards.
5. Use alcohol to clean the contacting surface to the drum mounting.
6. While taking care not to directly touch the video heads or cause damage to the upper drum, install by following the above steps in a reversed sequence.
7. Clean the tape running path of the upper drum assembly with a soft, fine textured cloth moistened with alcohol. At this time, wipe the drum with a gentle back and forth stroke motion in the same direction as the tape travel.
8. Check the video heads for proper dihedral and make adjustment if necessary.

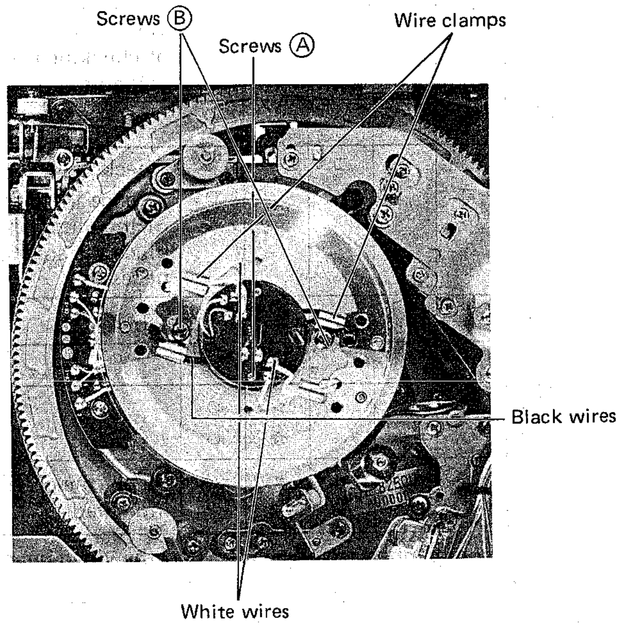


Fig. 4-20

Check and adjustment of the video head dihedral

Note: As observed on the screen, the relation between skew amount and supply back tension is not linear.

1. Connect the VIDEO OUT jack to the monitor, and play back the alignment tape (MORE-S). Observe the resulting picture.
2. If the picture is defelcted or skewed as shown in Fig. 4-21, use the SKEW control in order to straighten the white line (CH-1) on the left side of the screen.

Note: If the above conditions are not fulfilled, use R56 (SKEW PRESET) of the Reel Servo board to straighten the white line (CH-1) on the left side of the screen.
After adjusting video head dihedral, perform supply back tension adjustment (5.4.6).

3. With the white line (CH-1) aligned, observe the switching portion of the right side of the white line. Check that the deviation of the two channels at this white line in no more than half the width of the white line (0.5 sec).
4. When the deviation is not within this limit, determine the advance or delay of the phase of CH-2 video head according to Fig. 4-22. Then adjust the position of the CH-2 video head by using the dihedral adjustment taper pins.

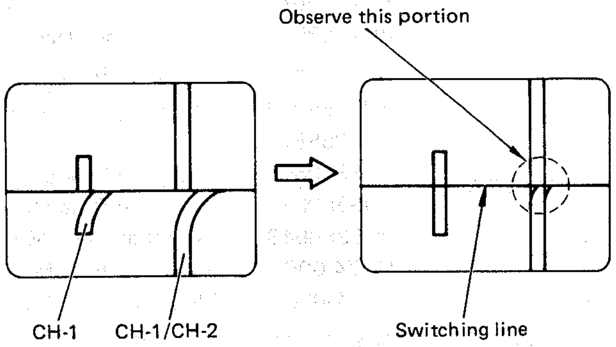


Fig. 4-21

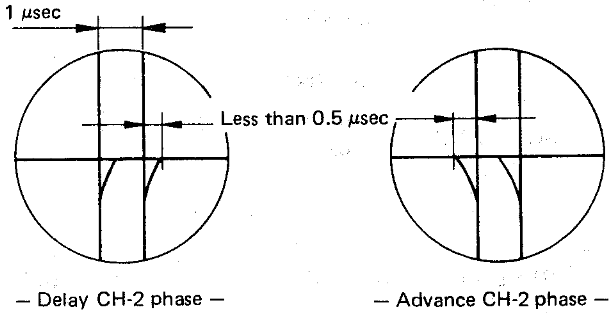


Fig. 4-22

5. Insert the adjustment eccentric pin into the adjustment holes of the CH-2 video head, while in stop mode, and screw them lightly until they are in contact with the video head.

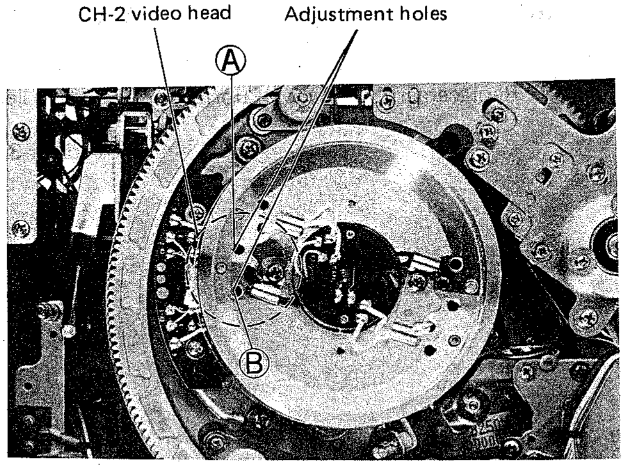


Fig. 4-23

6. If the phase is advanced, adjust the CH-2 video head by inserting the adjustment eccentric pin into the Ⓐ adjustment hole (in the drawing). On the other hand, if the phase is delayed, adjust by inserting the adjustment eccentric pin into the Ⓑ adjustment hole (in the drawing). The adjustment amount at one time should be kept at a small degree. Repeat adjustment and observation of the alignment tape consecutively until the proper phase is attained.

7. After dihedral adjustment of the CH-2 video head, perform the following checks and adjustments.
   1) Playback and recording of switching points.
   2) Control of head phase.
   3) General adjustments and checks of the video signal circuit.

4.4.2 Audio/Control head

1. Remove the 3 screws Ⓐ, and dismount the audio/control head assembly together with the mounting plate.

2. Remove the connector housing from the audio/control head mo8nting plate.

3. Unsolder the audio/control head mounting base to separate it from the assembly mounting plate.

4. Unscrew the 3 screws Ⓑ, and replace the audio/control head. Be careful with the coil springs.

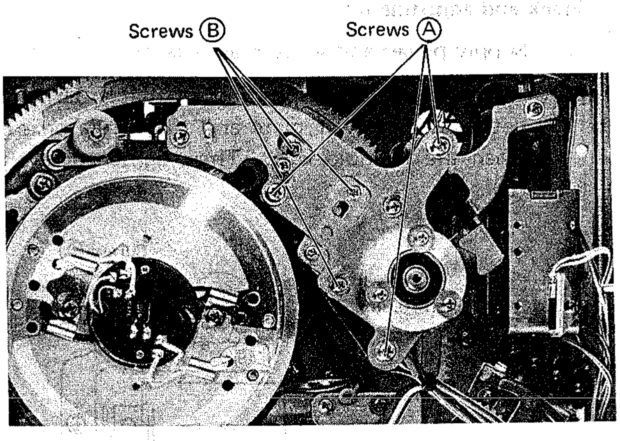


Fig. 4-24

5. To reassemble the mounting plate with the audio/control head, follow the above steps in a reversed sequence. As extreme height setting of the audio/control head relative to the mounting base will cause damage to the tape, be careful to adjust the spacing between the audio/control head and the mounting base to approx. 15.1 mm. This proper spacing will protect the tape from being damage as well as facilitating easier adjustment.

6. Perform the following after reassembly:
   1) Check and adjustment of the tape drive system and adjustment of interchangeability.
   2) Check and adjustment of the audio circuit.

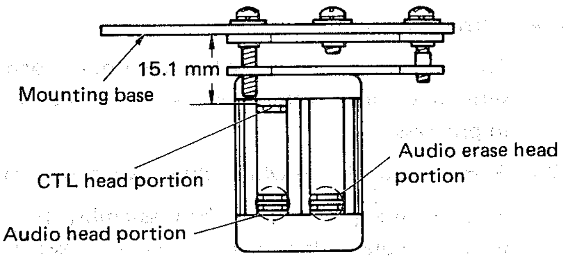


Fig. 4-25

4.4.3 Address/Full erase head (Full erase head only)

1. Remove the screws Ⓐ, Ⓑ and Ⓒ while being careful with the coil springs.

2. Remove the address/full erase head from the mounting base. Mount a replacement onto the mounting base.

3. To install, follow the above steps in a reversed sequence. Extreme height setting of the address/full erase head relative to the mounting base will damage the tape. Use a height gauge and measure the distance between the address/full erase head and the mounting base, so as to assure correct spacing inbetween.

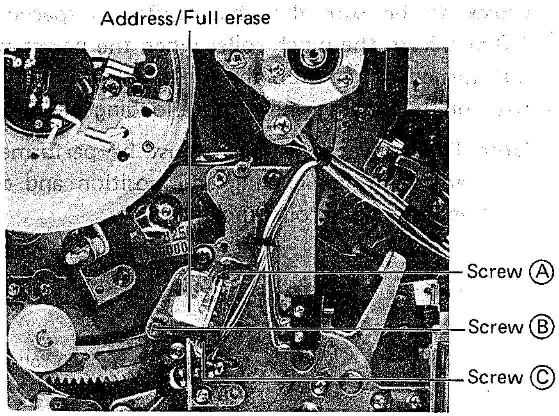


Fig. 4-26

4. Adjust screws Ⓐ, Ⓑ and Ⓒ so that the address/full erase head azimuth direction and the front to rear inclination of supply guide pole (2) become parallel with the tape transport.

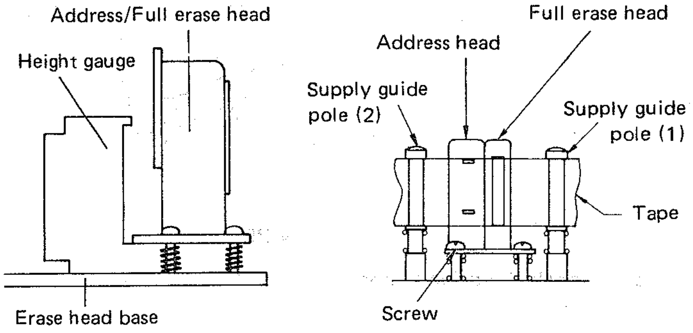


Fig. 4-27

5. After rough adjustment of the address/full erase head, perform the following checks and adjustment:
   1) Check and adjustments of the tape drive system and adjustments of interchangeability.
   2) Check and adjustment of the time code circuit.

4.4.4 Pinch roller arm assembly

1. Turn the loading ring without without loading a cassette, and turn off the power switch while the loading is in progress.
2. Remove E-washer B while taking care about the spring.
3. Remove the pinch roller arm assembly by lifting upwards. Replace the pinch roller arm assembly, while performing the following checks and adjustments.

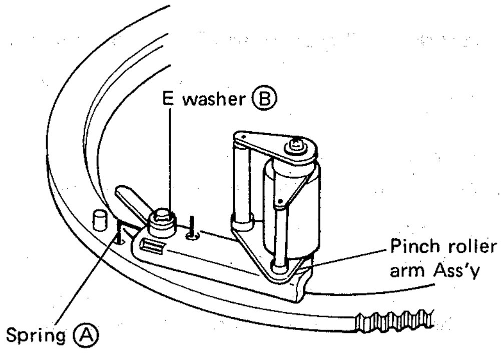

E washer Ⓑ
Pinch roller arm Ass'y
Spring Ⓐ

Fig. 4-28

4. Check to be sure that the capstan is spaced 0.5 to 1.0 mm from the pinch roller when the power switch is just turned off to stop the loading arm in action after rotating the loading ring without loading a cassette.

   Note: The above adjustment must be performed after adjusting the loading end position and confirming the pinch roller inclination.

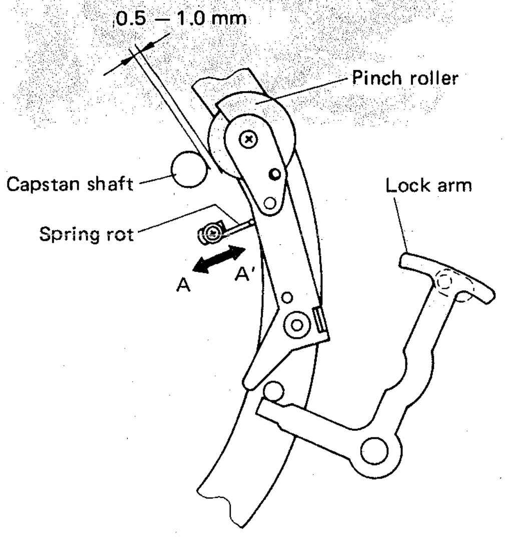

0.5 — 1.0 mm
Pinch roller
Capstan shaft
Lock arm
Spring rot
A
A'

Fig. 4-29

5. Check the drive system.

4.4.5 Pinch solenoid

1. Remove screw Ⓐ, and dismount the dew sensor.
2. Remove the 2 screws Ⓑ and Ⓒ.
3. Disconnect the resistor and lead wires.
4. While leaving the core in place, dismount the solenoid assembly.
5. Unscrew the screw from the rear of the holder, and disconnect the solenoid assembly.

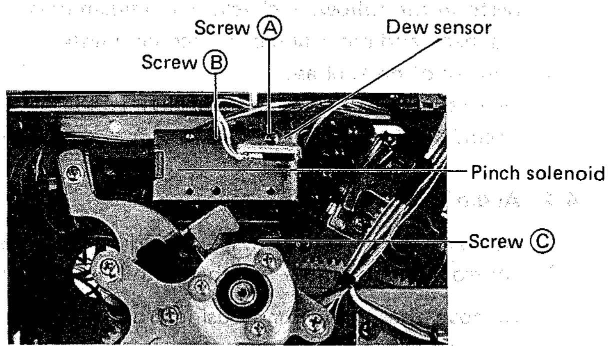

Screw Ⓐ
Dew sensor
Screw Ⓑ
Pinch solenoid
Screw Ⓒ

Fig. 4-30

6. Connect and install the new solenoid assembly following the above steps in a reversed sequence.

Check and adjustments

1. Supply power and set to playback mode.
2. Adjust the solenoid position so that a 0.5 mm spacing between the power plate and the regulator is obtained when the solenoid is on. Then tighten screws Ⓐ and Ⓑ.

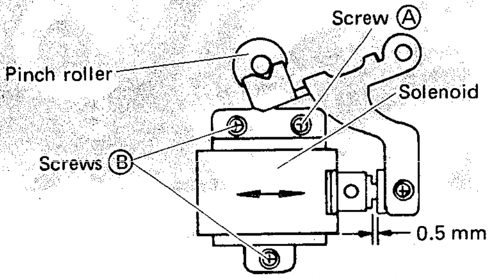

Screw Ⓐ
Pinch roller
Solenoid
Screws Ⓑ
0.5 mm

Fig. 4-31 Solenoid adjustment

3. After installing the solenoid in the right position, apply pressure with a finger on the end of the power plate to bend it down. Make sure, after the finger pressure, that the pinch roller press arm resumes its original position to turn on the micro switch.

4.4.6 Drum motor

The drum motor and the lower drum are replaced together.

1. Remove the upper drum. Refer to section 4.4.1.
2. Unsolder the 4 lead wires from the drum terminal.

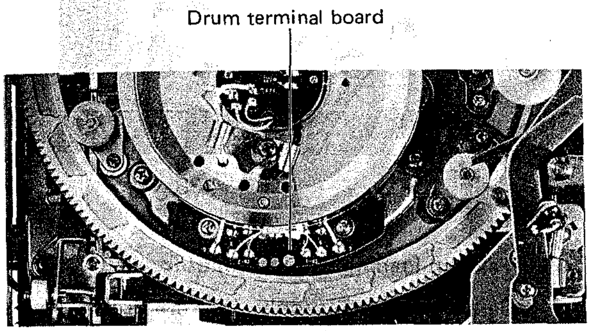


Fig. 4-32

3. Remove the connector housing from the drum motor.
4. Unscrew the 4 screws Ⓐ, and take out the lower drum assembly as far as the length of the lead wires of the pick up head will allow.
5. Remove the 2 screws Ⓑ, and disconnect the lower drum assembly.
6. Disconnect the stop ring and ring unit. Replace the lower drum assembly.

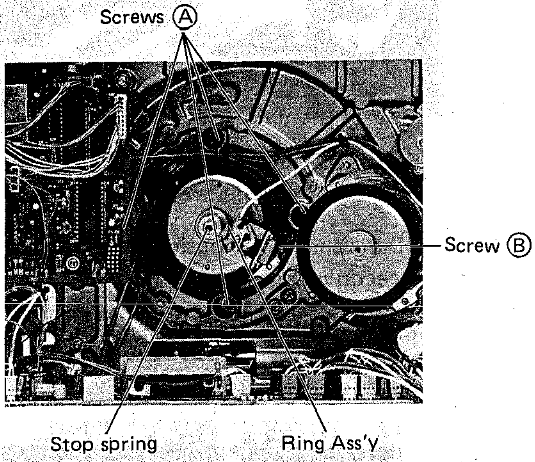


Fig. 4-33

7. Install the new, lower drum assembly folloing the above steps in a reversed sequence.

4.4.7 Capstan motor

Repalacement

1. Remove the 3 screws Ⓐ, and dismount the A/C head mounting plate.
2. Disconnect the connector housing from the A/C head board.

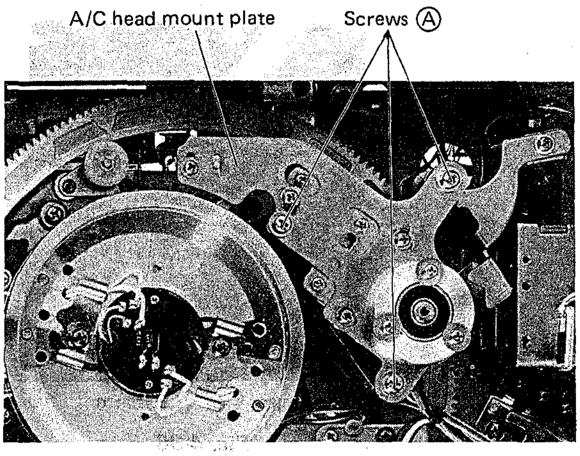


Fig. 4-34

3. While supporting the capstan motor from below, remove the 4 screws Ⓑ.

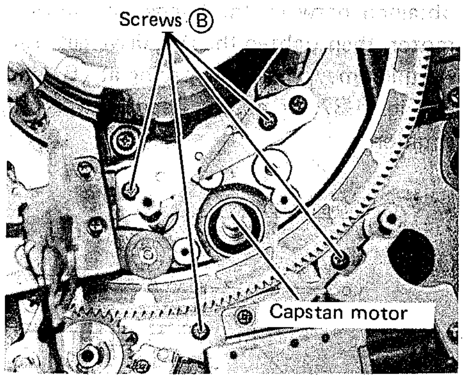


Fig. 4-35

4. Dismount the connector housing from the capstan motor, and take out the capstan motor.
5. Install the new capstan motor following the above steps in a reversed sequence.

Checks and adjustments

1. Capstan servo (electrical adjustment)

4.4.8 Loading ring motor and drive gear

1. Remove the E-ring and dismount the EL arm.
2. Loosen the set screw of the ring drive gear and remove the ring drive gear.
3. Remove the screws Ⓐ, and dismount the motor.

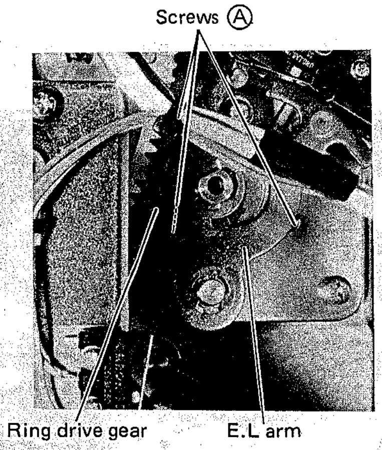

Screws Ⓐ
Ring drive gear
E.L arm

Fig. 4-36

4. Unsolder the lead wires, and replace the motor.
5. Secure the new motor with the screws Ⓐ.
6. Make an adjustment so that a spacing of 0.5 mm is obtained between the flanges of the ring drive gear and motor, then tighten the ring drive gear set screw.
   At this time, check for spacing at Ⓑ and Ⓒ indicated in Fig. 4-37. If absent, readjust very slightly to allow rotation.

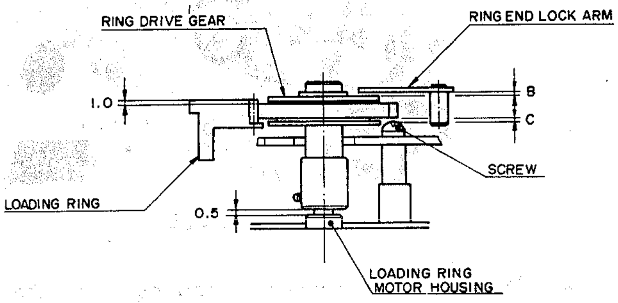

RING DRIVE GEAR
RING END LOCK ARM
1.0
B
C
SCREW
LOADING RING
0.5
LOADING RING MOTOR HOUSING

Fig. 4-37 Setting the Ring drive gear

7. Reinstall the EL arm.

   Note: Be sure to replace the entire motor assembly rather than the individual parts only.

Checks and adjustments

1. Check for proper engagement of the loading ring and drive gear, preferably with a backlash of 0.1 to 0.2 mm between the two.
2. If the engagement is too shallow or too deep, adjust with screws Ⓑ.

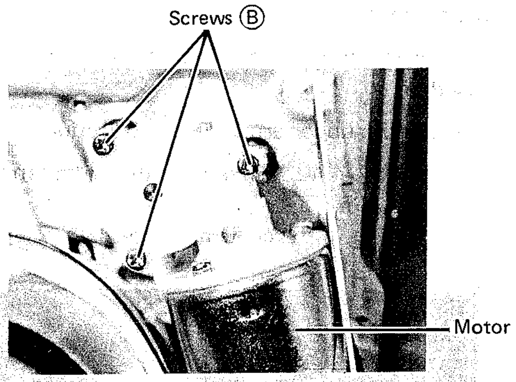

Screws Ⓑ
Motor

Fig. 4-38

4.4.9 Take-up loading arm drive motor

1. Cancel out the supply tension arm driver spring by removing screw Ⓐ.

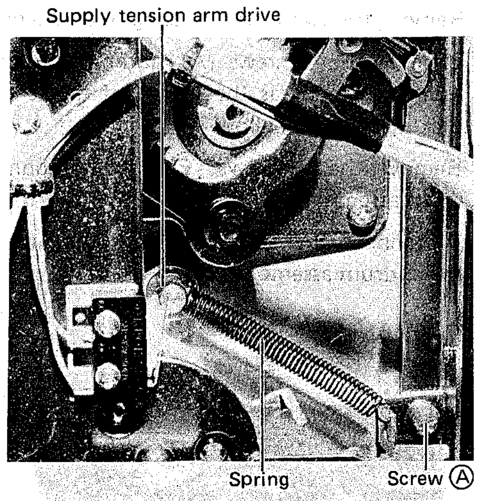

Supply tension arm drive
Spring
Screw Ⓐ

Fig. 4-39

2. Remove the connector housing and screws Ⓑ. Then shift the reel drive board out of the way.

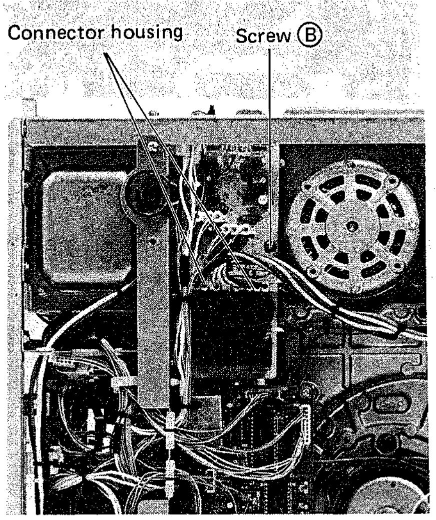

Connector housing
Screw Ⓑ

Fig. 4-40

3. Remove screws Ⓒ and disconnect the take-up loading arm drive motor.

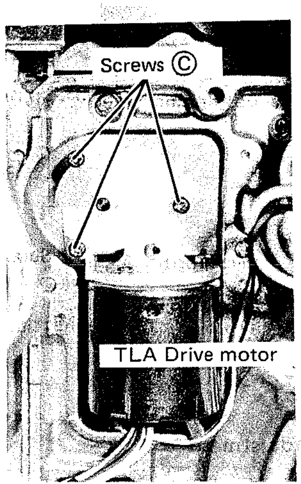


Fig. 4-41

4. Unsolder the lead wires, and replace the take-up loading arm drive motor.

   Note: Be sure to replace the entire motor assembly rather than individual parts only.

5. Install the drive gear on the new motor assuring a 0.5 mm spacing between the motor flange and the bottom of the drive gear. Then tighten the set screw of the drive gear.

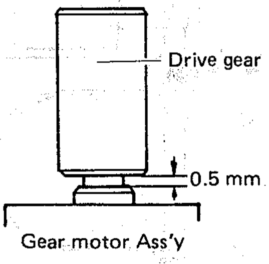


Fig. 4-42 Setting the drive gear

6. Check to be sure that the take-up loading arm is positioned as shown in Fig. 4-43, then mount the take-up loading arm drive motor.

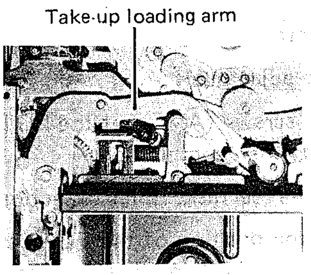


Fig. 4-43

7. Leave the reel drive board and spring disengaged while performing the checks and adjustments as follows:

Checks and adjustments

1. Check that the drive gear and the gear of the take-up loading arm assembly are not engaged.
2. Loosen the screws Ⓒ and adjust the meshing of the drive gear and the gear of the supply loading arm drive assembly. See Fig. 4-41.
3. Reinstall the connector housing to the reel drive board, and secure the board with the screws Ⓑ. See Fig. 4-40.
4. Secure the spring with the screws Ⓐ. See Fig. 4-39.

4.4.10 Compartmet moter

1. Remove the cassette compartment following the steps as mentioned in section 4.2.1.
2. Remove screws Ⓐ, and dismount the compartment motor assembly.
3. Loosen the set screws, and remove the drive gear.
4. Remove the screws Ⓑ, and dismount the compartment motor.

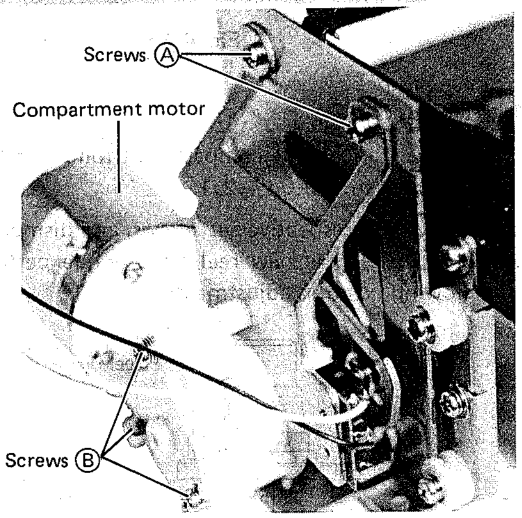


Fig. 4-44

5. Unsolder the lead wires, and replace the motor.
6. Secure the motor with screws Ⓑ and confirm that the microswitch becomes on.
7. Install the drive gear on the new compartment motor, assuring a 0.5 mm spacing between the drive gear and motor flange. Then tighten the set screw of the drive gear.

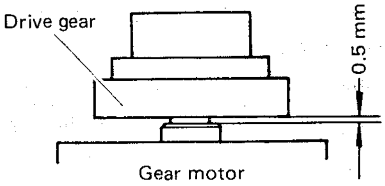


Fig. 4-45 Setting the drive gear

8. Secure the compartment motor assembly to the cassette compartment with the screws Ⓐ. See Fig. 4-44.

Cassette compartment installation

1. Set the cassette compartment on the subdeck and engage the rod with the rod holder.
2. While holding the cassette compartment in its lowered position, set the cassette compartment position jigs on the supply and take-up reel disks, and then secure the cassette compartment in its position.

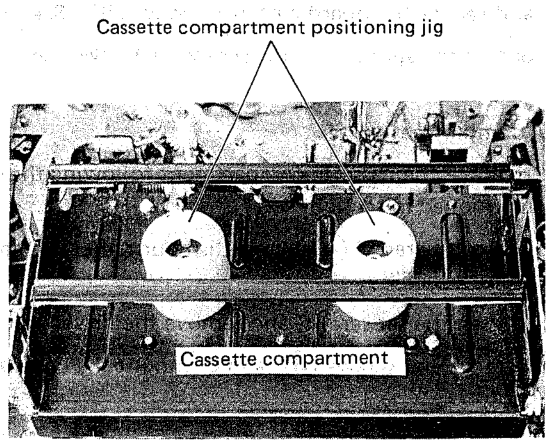

Cassette compartment positioning jig
Cassette compartment

Fig. 4-46

4.4.11 Reel disks

1. Remove the cassette compartment following the steps as mentioned in section 4.2.1.
2. Remove the respective set screws, and dismount the reel disks. Install the new reel disks, while performing the following position adjustments.

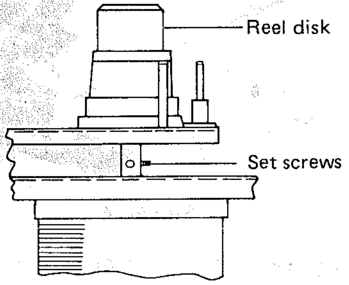

Reel disk
Set screws

Fig. 4-47

3. Set the reel positioning jig, and set the reel disk height jig onto the reel disk.
4. Loosen the reel disk set screw. Raise the reel disk to the height where it just touches the height jig. Then tighten the set screw.

   Note: Please note that the reel disk height jig is inverted according to the reel disk (supply or take-up reel).

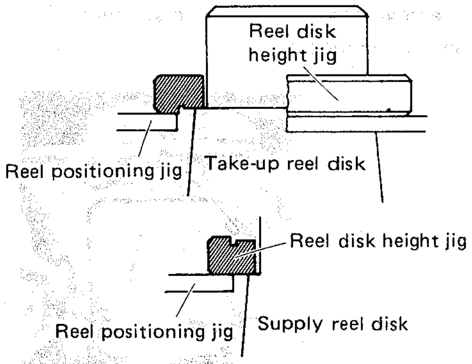

Reel disk height jig
Reel positioning jig
Take-up reel disk
Reel disk height jig
Reel positioning jig
Supply reel disk

Fig. 4-48 Reel height adjustment

4.4.12 Reel brake

Mounting and adjustment

1. Shift the brake holder in direction A, and secure with screw Ⓐ.
2. Move the other brake band holder in direction B—B′ so that the solenoid core stroke becomes 3.5 to 4 mm. Then tighten screw Ⓑ.
3. After setting the stroke, confirm that the brake becomes disengaged from the reel disk when the solenoid energizes.

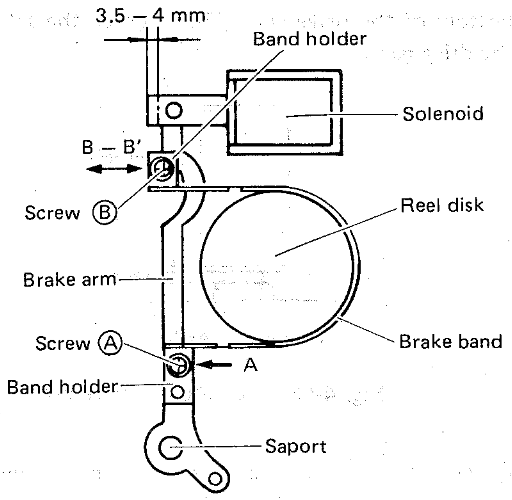

3.5 – 4 mm
Band holder
Solenoid
B – B′
Screw Ⓑ
Reel disk
Brake arm
Screw Ⓐ
Brake band
A
Band holder
Saport

Fig. 4-49 Reel brake adjustment

4.4.13 FG board

Mounting and adjustment

1. Use the screws Ⓐ to set the FG board in position, but do not tighten completely.
2. Install the reel disk. Refer to section 4.4.11.
3. Adjust the position of the FG board so that the photo-couplers are not in contact with the reel disk. Then tighten the screws Ⓐ.

   Note: If correct adjustment cannot be obtained, check the position of the reel motor, and make adjustment if necessary. Refer to section 4.4.14.
4. Engage the connector housing.

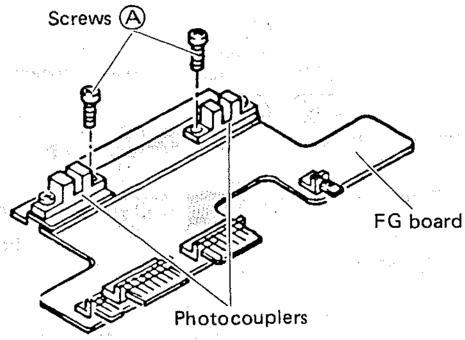

Screws Ⓐ
FG board
Photocouplers

Fig. 4-50 FG board

4.4.14 Reel motors

Replacement

1. Remove the cassette compartment.
2. Remove the brake band.
3. Remove the take-up tension arm.
4. Remove the band guide assembly.
5. Remove the solenoid and brake arm assemblies.
6. Remove the reel disk.
7. Remove the reel motor.

Note: The removal of the solenoid and brake arm assemblies may require dismounting of the boards or other parts. When removing the band guide assembly, first dismount the micro switch (S1).

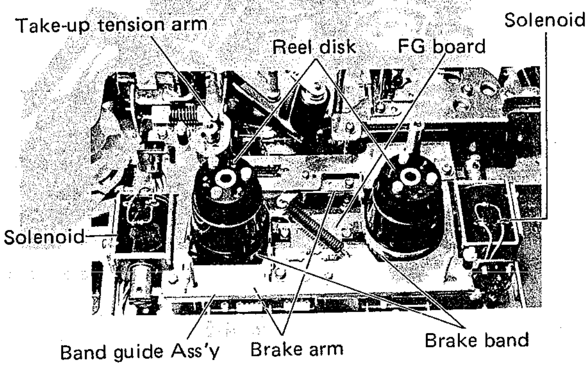

Take-up tension arm
Reel disk
FG board
Solenoid
Solenoid
Band guide Ass'y
Brake arm
Brake band

Fig. 4-51

Mounting and adjustment of the reel motors

1. Remove the connector housing of the reel drive board, and replace the reel motor.
2. Install the new reel motor, but do not secure firmly. Engage the connector housing.
3. Install the reel positioning jig.
4. Set the reel motor positioning jig in the reel positioning jig.
5. After determining the position, secure the motor firmly.

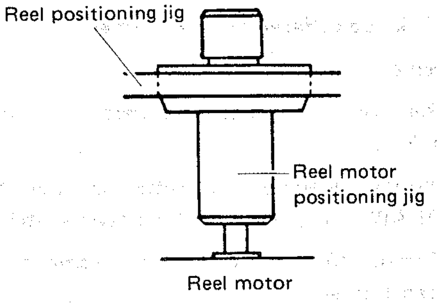

Reel positioning jig
Reel motor positioning jig
Reel motor

Fig. 4-52 Setting the reel motor

Reassembly

1. Reinstall the FG board and reel disk. Refer to section 4.4.13, 4.4.11.
2. Reinstall the solenoid and brake arm assemblies.
3. Reinstall the band guide assembly.
4. Install the take-up tension arm and engage the stop ring and shaft. Set the jig plate as shown in Fig. 4-53 and raise the stop ring to where it contacts the jig plate (the jig plate does not wobble on the 4 supporting points) and tighten the screw.
5. Reinstall the brake band. Refer to section 4.4.12.
6. Reinstall the cassette compartment. Refer to seciton 4.4.10.

Note: Check to be sure that all other parts and screws that might have been removed during the procedure are restored.

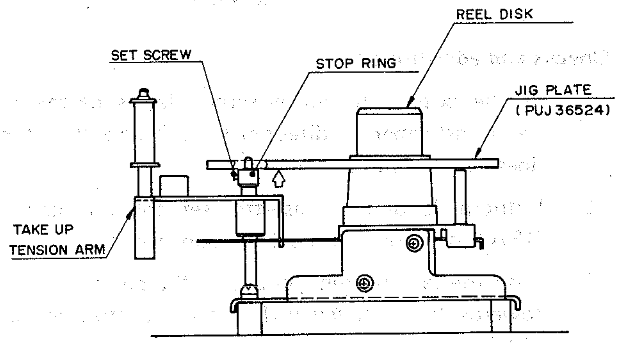

REEL DISK
SET SCREW
STOP RING
JIG PLATE
(PUJ 36524)
TAKE UP
TENSION ARM

Fig. 4-53

Check and adjustments

Reel servo (electrical adjustments)

4.4.15 Take-up differential transformer

Replacement

1. Remove the cassette compartment. Refer to section 4.2.1.
2. Without loading a cassette, set the machine to the DRAW mode,. Turn off the power switch.
3. Remove the screws Ⓐ, and dismount the differential transformer.

   Note: The disassembly in advance of the protector assembly after removing the screws Ⓑ, will result in easier dismounting of the transformer.
4. Reinstall the new differential transformer following the above steps in a reversed sequence, while performing the necessary checks and adjustments.

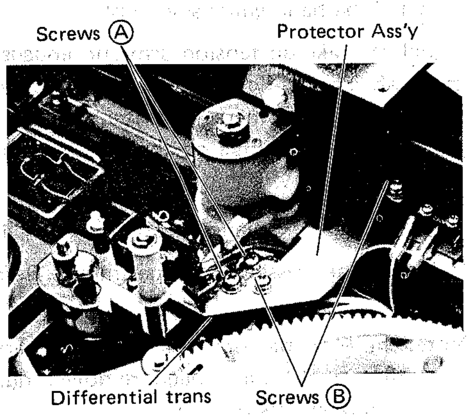


Fig. 4-54

Checks and adjustments

1. To the extent allowed by screw play, slide the differential transformer in direction Ⓐ (observe that the shaft does not deviate) and secure.
2. Without loading a cassette, set the machine to the DRAW position. Turn off the power switch.
3. Push the take-up tension arm at the point Ⓑ. by hand, towards the installed differential transformer, so as to obtain a 2.6 mm spacing between the differential transformer end face and the transformer shaft E-washer by means of a suitable feeler gauge.

   Note: Use a feeler gauge thickness in the range of 2.5 to 2.7 mm.
4. Adjust the hexagon socket head bolt Ⓒ, so tha the dampers 1 and 2 are separated apart from each other at the distance (ℓ), equivalent to the free length of the coil spring interposed between them.
5. Check to be sure that the take-up tension arm will resume its original position when it is let free after having been biased in either direction D–D'.

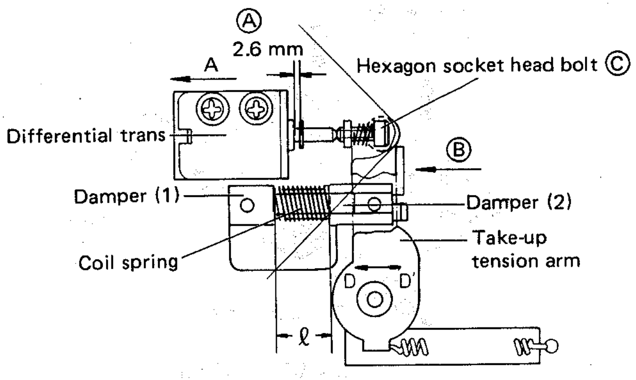


Fig. 4-55

6. After completion of the above adjustments, perform overall checks and adjustments.

4.4.16 Supply differential transformer

Replacement

1. Remove the cassette housing.
2. Remove the screws Ⓐ, and take out the supply differential transformer.
3. Connect the lead wires to the new supply differential transformer, and reinstall following the above steps in a reversed sequence, while performing the necessary checks and adjustments.

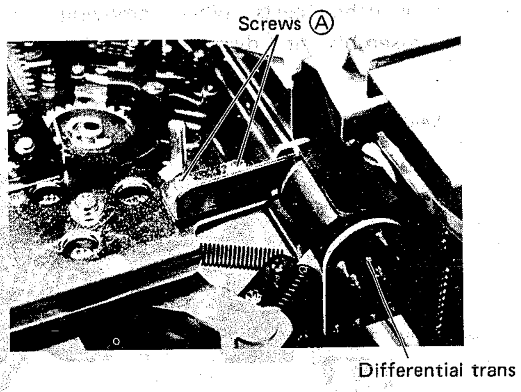


Fig. 4-56

Checks and adjustments

1. Slide the differential transformer in direction A as allowed by screw play. (Check that the shaft does not deviate.)
2. Without loading a cassette, set the machine to the DRAW mode. Turn off the power switch.
3. Push the supply tension arm at the point B, by hand, towards the installed differential transformer so as to obtain a 0.6 mm spacing between the transformer and transformer shaft washer by means of a suitable feeler gauge fitted in the gap Ⓐ.

   Note: Use the feeler gauge thickness in the range from 0.5 to 0.7 mm.

4. Adjust the hexagon socket head bolt Ⓒ so as that the dampers (1) and (2) are spaced from each other at the distance (ℓ), equivalent to the free length of the coil spring interposed between them.
5. Check to be sure that the supply tension arm will resume its original position when it is let free after having been biased in either rotational direction.
6. At this time, check for proper spacing between the supply tension pole and head mounting base.

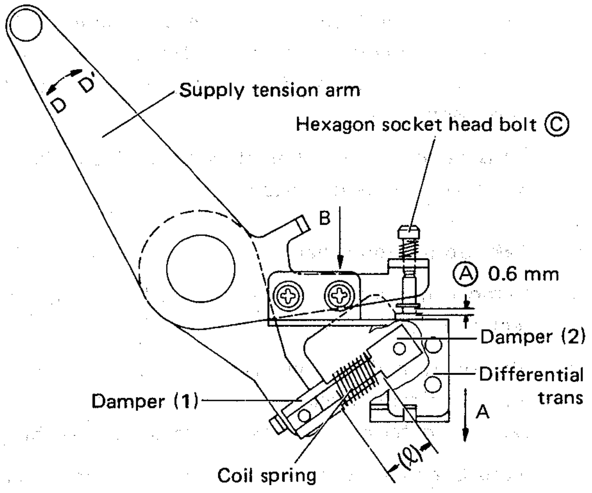

D
D'
Supply tension arm
Hexagon socket head bolt Ⓒ
B
Ⓐ 0.6 mm
Damper (2)
Differential trans
A
Damper (1)
Coil spring
(ℓ)

Fig. 4-57

7. After completion of the above adjustments, perform overall checks and adjustments.

4.4.17 Ring end lock plate

Checks and adjustments

1. Remove the E-washer, and dismount the lock arm.
2. Remove the screws Ⓐ, and dismount the ring end lock plate.

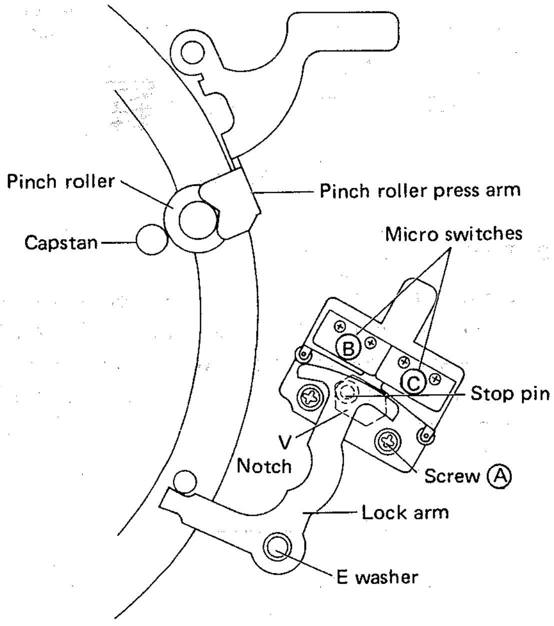

Pinch roller
Capstan
Pinch roller press arm
Micro switches
Ⓑ
Ⓒ
Stop pin
V
Notch
Screw Ⓐ
Lock arm
E washer

Fig. 4-58

3. Separate the micro switches from the ring end lock plate, and replace the lock plate.
   Install the new ring end lock plate following the above steps in a reversed sequence, while performing the necessary checks and adjustments.

Checks and adjustments

1. Rotate the loading ring to the loading end, and turn on the pinch roller solenoid.
2. At this moment, make sure that the V-notches of the pinch roller press arm are evenly embracing the pinch roller at its 12.6 mm diameter portion, as shown. Adjust the position on the reel plate so that the stop pin on the forward end of the rock arm is precisely fitted into the forward end of the rock arm is precisely fitted into the V-notch in the cutout of the reel plate, as shown in the figure.
3. Also, with the ring end lock plate in this position, make sure that the micro switch Ⓑ is set to the ON positon.

   Note: If the micro switch Ⓑ is not set to the ON positon, or if it tends to turn off, adjust the position of the micro switch Ⓑ. See Fig. 4-58.
4. At end of unloading, confirm that the microswitch (C) is on.

4.4.18 End set roller

1. Remove the E-washer, and dismount the end set roller. Install the new end set roller, while performing the following checks and adjustments.
2. Turn the unloading arm in order to move the end set roller to the unloading end.

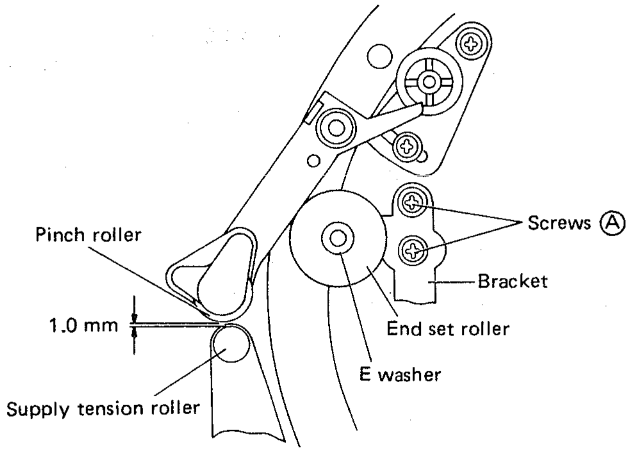

Pinch roller
1.0 mm
Supply tension roller
Screws Ⓐ
Bracket
End set roller
E washer

Fig. 4-59

3. With the end set roller in this position, make sure that the pinch roller is spaced at a distance of 1 mm from the lower guide flange of the supply tension roller on the supply tension arm.
4. If the spacing is of another value than this value, adjust the position of the bracket by way of the screws Ⓐ.
5. Lock the screws A in position.

4.4.19 Pinch roller press arm V-notches

1. Set the V-notch checking jig on the capstan shaft.
2. Lightly push on the forward end of the power plate to move the balls of the jig into the upper and lower notches of the press arm. Check to be sure that the balls are evenly contacting both edges of the notch at both ends without having any gaps.
3. If the contacts are uneven, or if they do not coincide with one another, change the pinch roller press arm.

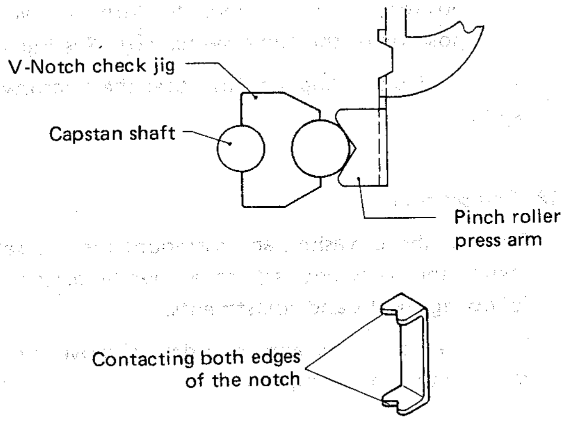


Fig. 4-60

4.5 CHECKING AND ADJUSTMENT OF THE TAPE TRANSPORT SYSTEM

4.5.1 Before checking and adjustment

1. To ensure efficient checking and adjustment of the tape transport system, the height of the various poles and rollers for guiding the tape travel must be set to the specified values. If these are not according to the specifications, the test tape will run through the disaligned sliding surfaces of these poles and rollers resulting in damage to the tape itself. Moreover, increased labor and time will be consumed for additional adjustments of the system and its interchangeability, which might otherwise have been saved.
2. Consequently, the height setting must be checked whenever standard is established.

4.5.2 Take-up tension roller

1. Remove the cassette compartment following the steps in section 4.2.1.
2. Slightly turn the loading ring, by hand, to give space and set the master plane jig on the subdeck. Use a height gauge to determine the take-up tension roller height.

   Note: Use the more narrow side of the height gauge for contact to the side of the roller.
3. Make sure that the bottom of the upper flange of the roller rises 24 mm above the upper surface of the master plane jig. Refer to Fig. 4-61.
4. If the distance is of another value than this value, adjust the screw at the top of the take-up tension roller to bring it to the correct height setting.

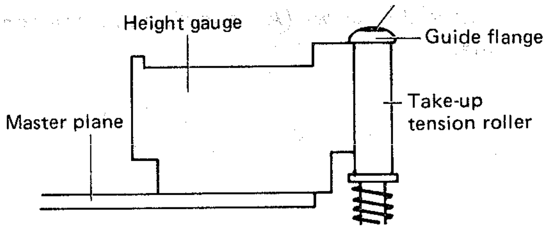


Fig. 4-61

4.5.3 Parallel check

1. Set the height gauge (PUJ43780) on the subdeck and check the perpendicularity as shown in Fig. 4-62.
   If the above conditions are not fulfilled, replace the take-up tension arm assembly or make a suitable bend in the arm bracket connected.

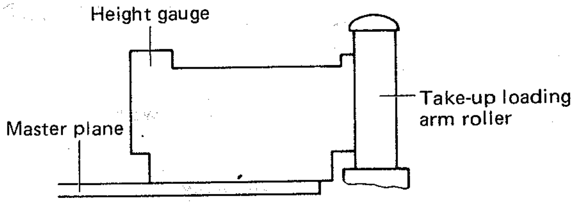


Fig. 4-62

4.5.4 Supply tension roller

1. Remove the cassette compartment following the steps in section 4.1.6.
2. Slightly rotate the loading ring, by hand, to give space and to set the master plane jig on the reel disk. Use a height gauge to determine the supply tension roller height.

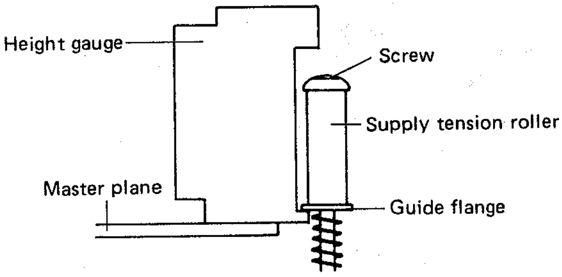

Height gauge
Screw
Supply tension roller
Master plane
Guide flange

Fig. 4-63

3. Make sure that the bottom of the supply tension roller lower flange rises 1.5 mm above the upper surface of the master plane jig. Refer to Fig. 4-63.
4. If the distance is of another value than this value, adjust the screw at the top of the supply tension roller to bring the roller to the correct height setting.

4.5.5 Fast supply guide pole

1. Remove the screw Ⓐ, and dismount the band holder.
2. Remove the screw Ⓑ, and dismount the protector release.

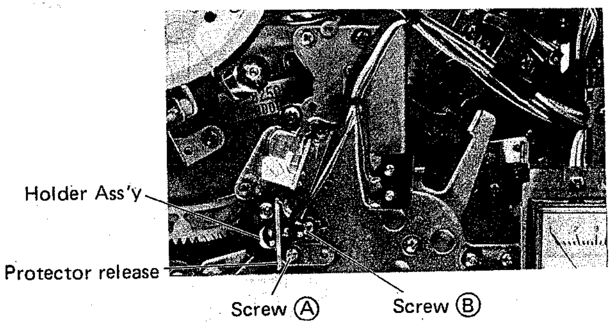

Holder Ass'y
Protector release
Screw Ⓐ
Screw Ⓑ

Fig. 4-64

3. Set the height gauge on the erase head mounting head. Make sure that the bottom of the fast supply guide pole upper flange rises 36.5 mm above the erase head mounting base. Refer to Fig. 4-65.
4. If the distance is of another value than this value, adjust the screw at the top of the fast supply guid pole to bring it to the correct height setting.

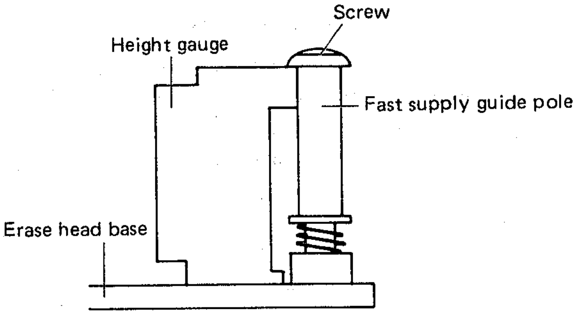

Screw
Height gauge
Fast supply guide pole
Erase head base

Fig. 4-65

5. After the height adjustment, reinstall the band holder assembly and protector release. (Check end sensor adjustment.)

4.5.6 Loading mode

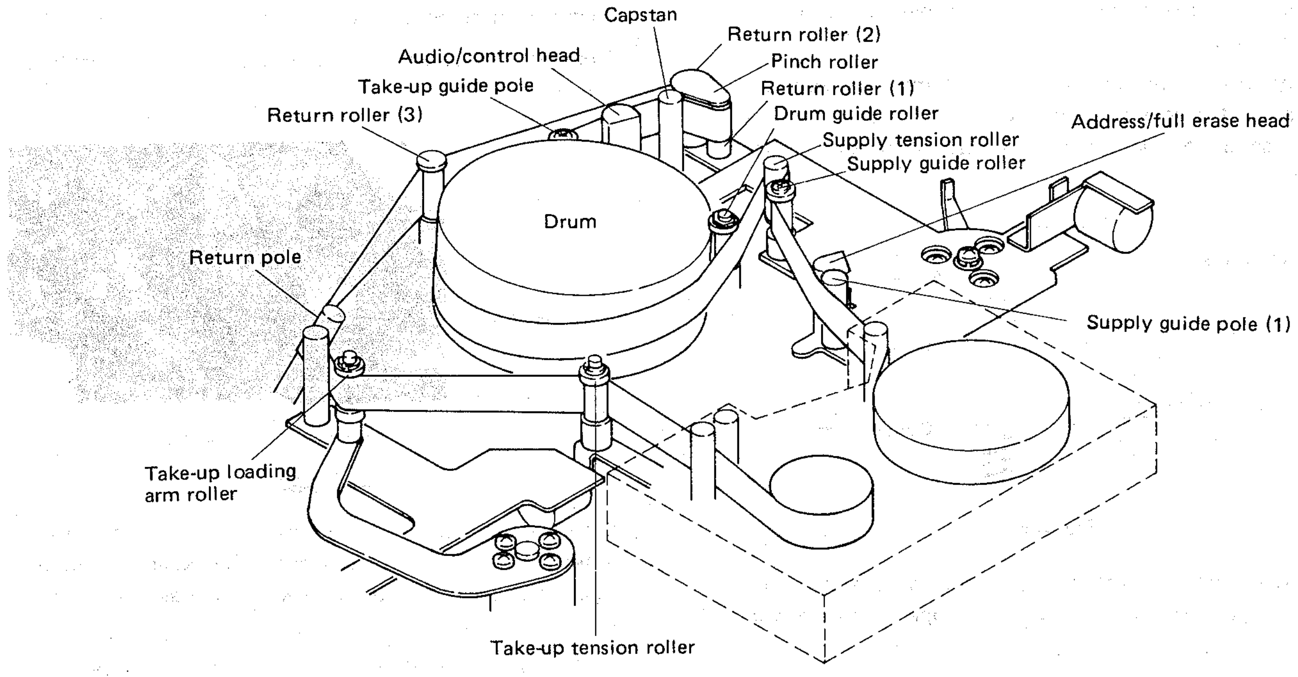

Capstan
Return roller (2)
Audio/control head
Pinch roller
Take-up guide pole
Return roller (1)
Return roller (3)
Drum guide roller
Address/full erase head
Supply tension roller
Supply guide roller
Drum
Return pole
Supply guide pole (1)
Take-up loading arm roller
Take-up tension roller

Fig. 4-66

1. Use self-recording tape, and perform loading at both the beginning and end portions of the tape.
2. Check the areas of the following guide poles and guide rollers for tape creasing, wrinkling or other evidence of improper alignment.
   1) Take-up tension roller
   2) Take-up loading arm roller
   3) Return poles 2 and 3
   4) Pinch roller
   5) Supply tension roller
   6) Supply guide rollers
   7) Supply guide poles 1 and 2
3. If the above conditions are not fulfilled, adjust in the play mode and again check, then perform reel servo circuit adjustment.

4.5.7 Playback mode

1. Use a spare cassette (KCS-20) and set the machine to play back the tape.
2. Check the tape transport of the tape at the supply tape drive as follows:
   1) Check that tape transport is limited by the upper flanges of the supply guide poles 1 and 2 and of the drum guide roller, and also at the same time by the lower flange of the supply tension roller. Also check that the tape is running along the lead of the drum at the point where the tape approaches the drum.
   2) If the above conditions are not fulfilled, finely adjust the supply guide pole 2, the drum guide roller or the supply tension roller for proper height setting.

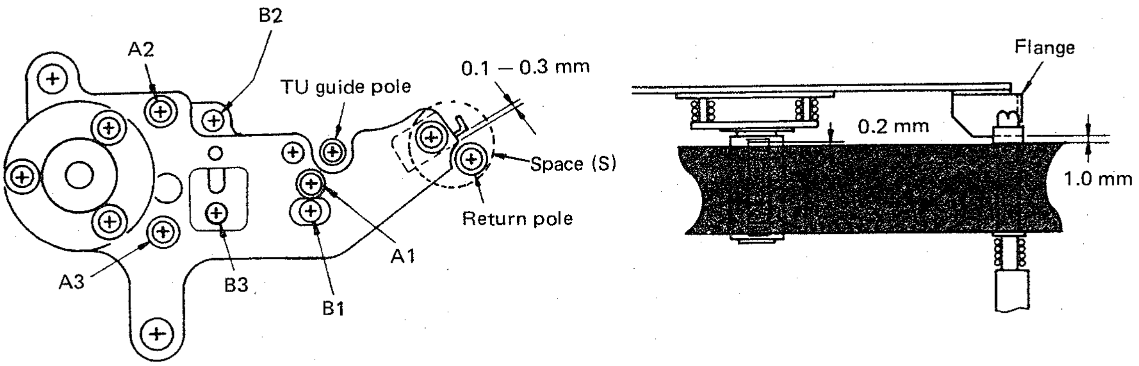

B2
A2
0.1 – 0.3 mm
TU guide pole
Space (S)
Return pole
A1
A3
B3
B1
Flange
0.2 mm
1.0 mm

Fig. 4-67

3) If this fine adjustment involves an extreme deviation from the original height setting of one or more of these rollers, with a resultant increase in the transversely uneven tension of the tape between them, adjust, while checking, the supply guide 2 or the supply tension roller for proper height setting or inclination with respect to the plane of the reel disk, the erase head for proper tilt and the reel disks for proper height setting.

3. Tape path at A/C head

1) Insert tape and set for the play mode.

2) Adjust the take-up guide pole height to match the drum lead.

3) Adjust the audio head height inclination. Screws B1, B2 and B3 adjust the height, while B1 also adjusts the azimuth, and B2 and B3 also adjust the front to rear inclination.

Note: Although the A/C head position is not adjusted at this time, tighten screws A1, A2 and A3 so that screw C, notch D and screw B3 are in a straight line.

4) Mutually adjust the height and inclination of the take-up guide pole and audio head. As indicated in Fig. 4-67. Set to where about 0.2 mm of the control head core is visible above the upper edge of the tape.

5) While tape is present, adjust space (S) for 0.1 to 0.3 mm.

6) Adjust the return pole height to position the upper edge of the tape 0.1 mm below the flange.

4. Check the running condition of the tape at the take-up drive section as follows:

1) Check that tape transport is limited by the lower flange of the take-up loading arm roller, and at the same time by the upper flange of the take-up tension roller.

2) Confirm absence of curling, wrinkling, etc. as shown in Fig. 4-66.

3) Check that the tape is running along the in-cassette guide pole with proper spacing from its upper edge, but without creasing or wrinkling at the lower edge areas of the guide pole.

4) If the above conditions are not fulfilled, adjust the height and inclination of the take-up tension roller, the position of the return pole and the height of the reel disk.

5) Then, set the machine in search fast forward mode, and go through the above steps (1 through 3). If the above (steps 1 to 3) conditions are not fulfilled, repeat the same procedures, 1) through 4), in the playback mode again, and make necessary adjustments.

4.6 INTERCHANGEABILITY CHECKS AND ADJUSTMENTS

Before using the alignment tape, use a spare cassette and check for smooth tape transport. As to the audio/control head and erase head, the interchangeability adjustment is affected to a considerable degree by their forward and backward tilt. Therefore, the adjustment of these heads must be carried out completely.

4.6.1 Audio/Control head adjustment

1. Connect an oscilloscope to the TP-9 (CH-1 PB OUT) of the audio board.
2. Reproduce a 10 kHz audio signal (color bar signal portion) and observe the waveform.

Audio azimuth adjustment

1) Turn the azimuth adjustment screw B to obtain maximum 10 kHz audio output.

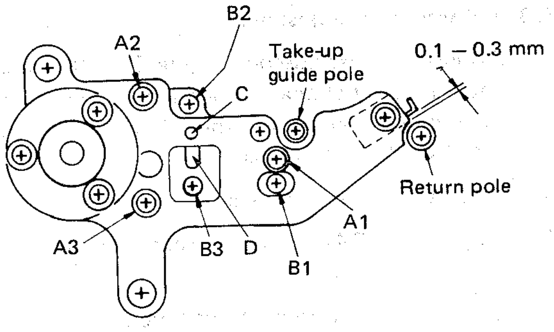


Fig. 4-68

Audio head height adjustment

1) Turn the height adjustment screws B1, B2 and B3 in either direction, slightly in equal amounts and one at a time, and observe the audio output variations. See Fig. 4-68.

2) At this time, if the audio output tends to increase, turn the screws B1, B2 and B3 in the same direction so that the audio output is maximized. Conversly, if the audio output tends to decrease, turn the screw in the reverse direction so as to maximize the audio output. See Fig. 4-68.

4.6.2 FM waveform adjustment (1)

1. Connect an oscilloscope to the TP-1 (FM OUTPUT) of the P.B. VIDEO board.
   Trigger the oscilloscope externally with the signal from the TP-25 (DRUM F.F.) of the CAPSTAN SERVO board.
2. Play back a stairstep of the alignment tape.
3. If the waveform appears as shown by A or B in Fig. 4-69, adjust the height of the supply guide pole (2), take-up guide pole, supply tension roller, A/C head, drum guide roller and full erase head to obtain the wave pattern shown by E.

4. If the waveform appears as shown by C in Fig. 4-69, adjust the height of the supply guide pole (2), supply tension roller, drum guide roller and full erase head to obtain the wave pattern as shown by E.

5. Adjust the height of the take-up guide pole for the form E, in case of D (Fig. 4-69).

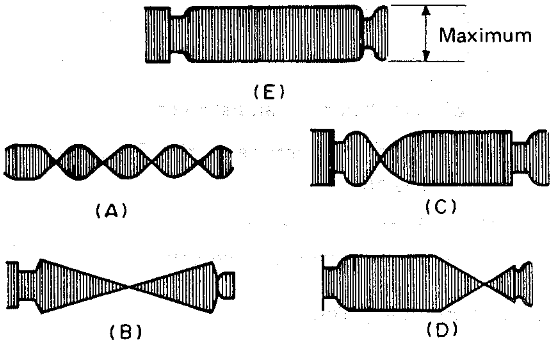


Fig. 4-69

4.6.3 FM waveform adjustment (2)

1. Connect an oscilloscope to the TP-1 (FM OUTPUT) of the P.B. VIDEO board. Trigger the oscilloscope externally with the signal from the TP-25 (DRUM F.F.) of the CAPSTAN SERVO board.
2. Play back a stairstep signal of the alignment tape (MO-IS).
3. Adjust the TRACKING control for minimum FM output waveform.
4. Observe the waveform at this time. If it appears as shown by one of the following, then follow the instructions:
   1) A or B (Fig. 4-70)
   Adjust the height of the supply tension roller and supply guide roller (2), drum guide roller, full erase head to obtain the waveform shown by F, G or H. If the waveform fluctuates, adjust the point of minimum fluctuation.
   2) C or D (Fig. 4-70)
   Adjust the height of the take-up supply pole and the A/C head, and finely adjust the azimuth screws so that the waveform appears as F, G or H (Fig. 4-70). If the waveform fluctuates, adjust the point of minimum fluctuation.
   3) E (Fig. 4-70)
   Perform both of the above adjustments (repeat if necessary) to obtain the F, G or H waveform (Fig. 4-70).
5. Adjust the audio head azimuth for maximum audio output. At this time, confirm that the waveform appears as F, G or H.
   If the waveform differs from one of these patterns, adjust the audio head height setting, inclination and azimuth, so that the waveform and audio output conditions are met.
6. Vary the TRACKING control from minimum to maximum, and then form maximum to minimum FM output. During this time, if the FM waveform varies unevenly, finely adjust the height setting of the supply guide pole (2), take up guide pole, supply tension roller, drum guide roller and full erase head.

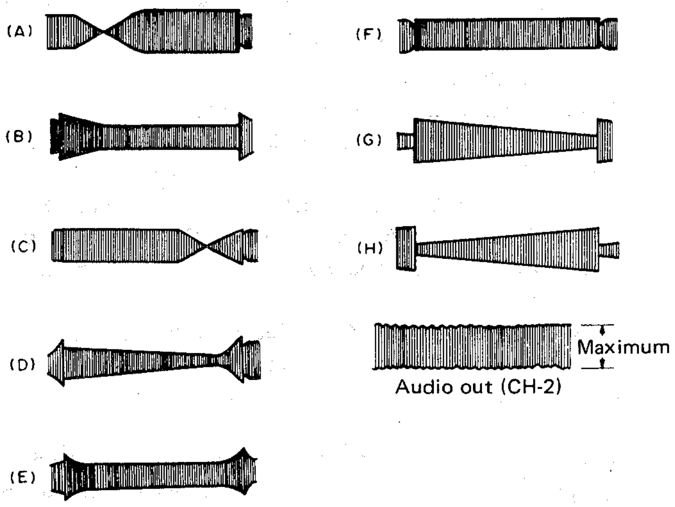


Fig. 4-70

4.6.4 FM waveform check

1. Connect an oscilloscope to the TP-1 (FM OUTPUT) of the P.B. VIDEO board. Trigger the oscilloscope externally with the signal from the TP-21 (DRUM OFF) of the DRUM SERVO board.
2. Use a spare cassette, supply the stairstep signal, record and play back.
3. Adjust the TRACKING control for maximum FM waveform output.
4. Read the level corresponding to point "a" in Fig. 4-71. If the waveform serrated at this point, read the level of the most uniform serrations, as shown in Fig. 4-71.
5. As indicated by the broken lines, read the level corresponding to point "b". At this time, confirm the following relationship:
   $20 \log \frac{b}{a} \geqq -1$ dB
6. Similarly, read the levels corresponding to points "c" (drum input) and "d" (drum output). Confirm the following relationships:
   $20 \log \frac{c}{a} \geqq -3$ dB $20 \log \frac{d}{a} \geqq -3$ dB
7. Turn the SKEW control fully counterclockwise,. Confirm that FM loss and picture noise is not present (by observing the monitor).

Note: The skew variation range must be more than ±2 µsec. on the monitor screen.

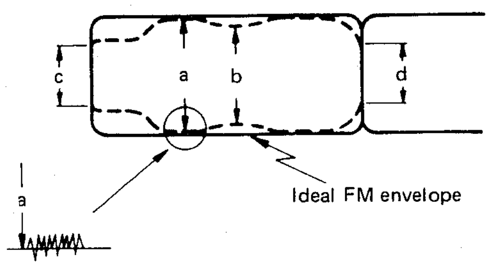


Fig. 4-71

4.6.5 Control head position

1. Ground TP-7 of the HEAD AMP board in order to defeat the CH-2 FM waveform.
2. Connect a dual-trace oscilloscope to TP-21 (DRUM FF) of the DRUM SERVO board and TP-1 (FM OUT) of the PB VIDEO board.
3. Play back the stairstep signal of the alignment tape (MO-IS).
4. Loosen 3 screws Ⓑ of the audio/control head base. See Fig. 4-72.
5. Set the CTL head positioning jig into the jig holes.

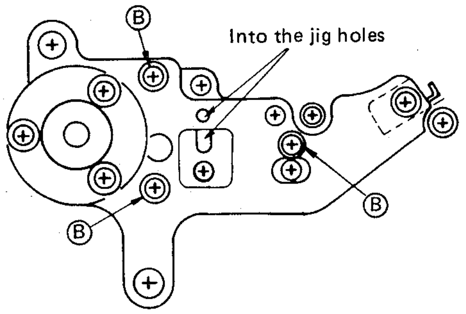


Fig. 4-72

6. Shift the audio/control head to the maximum position toward the capstan. Gradually shift it toward the drum to obtain the positional relationship indicated in Fig. 4-73, then very carefully adjust the position for maximum FM output. Afterwards, tighten screws Ⓑ.

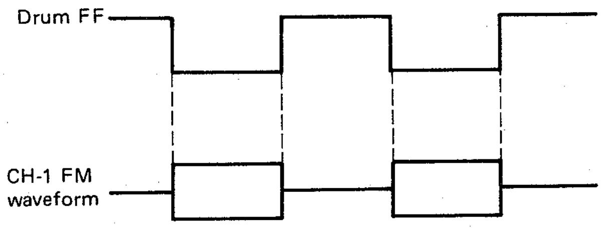


Fig. 4-73

Servo circuit adjustment

1. Record and play back the switching point.
2. Tracking preset

4.6.6 Reverse mode checking

1. Connect the remote control unit and set for the search REV. (X1) mode. With respect to the play mode, confirm that the control pulse interval is 33.3 msec and the control level within −2 dB.
2. Use KCA-60 cassette, and operate in the Play and REV modes.
3. Check for uniform lateral (edge to edge) tape position at the return roller (3). If necessary, adjust the return roller (3) height.

   If this cannot be corrected by adjusting the return roller height, check the V notch of the pinch roller pressure arm (see Fig. 4-60). If this is normal, replace the pinch roller arm assembly.

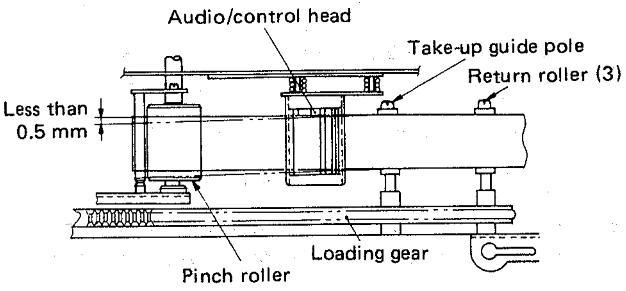


Fig. 4-74

4. Operate the machine in the following sequence: playback, reverse, still, playback. Observe the FM waveform, and check that the waveform returns to the Play state within 1.0 second after the Play mode is resumed.

   Note: When set from Reverse to Still, confirm that the FM waveform crosspoint is at one point as shown in Fig. 4-75.

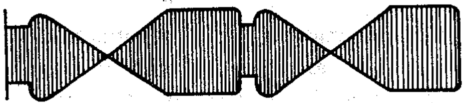


Fig. 4-75

4.6.7 Loading mode

1. Use a KCS-20 cassette and observe loading.
2. While loading is in progress, check the setting of the tape at the guide of the take-up pole.
3. As shown in Fig. 4-76, tape protruding beyond the lower edge of the take-up guide pole is not acceptable.
4. If the tape protrudes, adjust the height of the take-up guide pole.

   Note: Slight curling of the tape within the guide pole area is permitted.

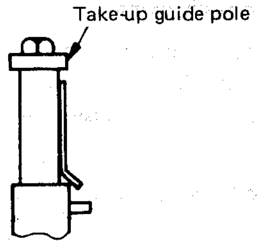

Take-up guide pole

Fig. 4-76

5. Just before the pinch roller engages, check that the tape is positioned at a maximum of 1 mm above the lower end of the return pole.

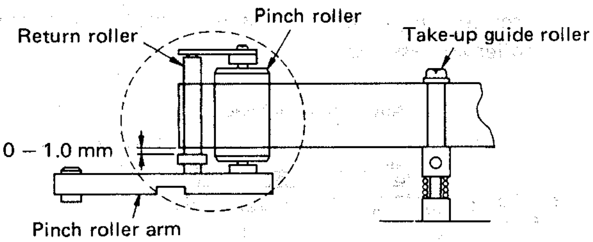

Pinch roller
Return roller
Take-up guide roller
0 – 1.0 mm
Pinch roller arm

Fig. 4-77

6. When the pinch roller is engaged and the tape running normally, check that the tape rises from the bottom toward the top.
   At this time, observe the FM waveform and confirm absence of reduction at the TU side, as indicated in Fig. 4-78.

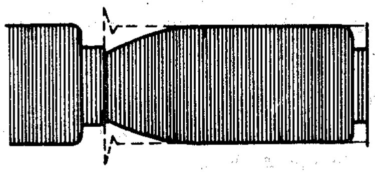


Fig. 4-78

7. If above check is out of specification, replace the pinch roller arm assembly. Afterwards, repeat the tape transport check and adjustments, and interchangeability adjustments.

4.6.8 Final check and adjustments

1. Recording and playback levels of the audio circuit.
2. The time code circuit.
3. Outer video signal circuits (general checks and adjustments).

SECTION 5
ELECTRICAL ADJUSTMENTS

5.1 BEFORE ADJUSTING

Prior to adjusting be sure to perform all necessary repairs and replacements. In the case of complex products, such as VCR and their related equipment, it may be possible to temporarily "adjust out" the effects of a faulty component. The resulting unstable condition invariably leads to costly "call backs" and re-repairs. For this reason, in event of electrical circuit failure, by all means use test instruments to locate and repair the point of failure before proceeding with adjustments.

5.1.1 Required test equipment and jigs

1. Color monitor-TV
2. Oscilloscope (wide-band, dual trace)
3. Test signal (color bar, stairstep) generator
4. Frequency counter
5. Audio tester (combination audio frequency oscillator and meter).
6. Digital voltmeter
7. Signal generator (10 Hz to 10 MHz)
8. Sweep generator (10 Hz to 10 MHz)
9. Torque meter (PUJ42373)
10. Torque meter (PUJ42373R) for Reverse
11. RM-70U, RM-82U or RM-88U (Remote control)

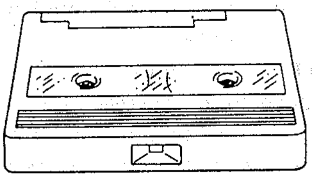
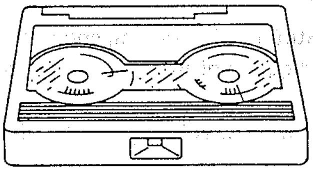
12. Alognment tapes MO-2B, MO-2SB, MOVE-7	13. Torque meter PUJ42373, PUJ42373R
	

Table 5-1

5.1.2 JVC alignment tape contents

1. MO-2B, MO-2SB

No.	Playback time	Video signal	Audio signal	Applications
1	4 min.	Monoscope	None	Interchangeability checks and adjustments Switching point adjustment
2	2 min.	None	3 kHz	Tape speed, wow and flutter checks
3	2 min.	Monoscope	1 kHz 0 dB	General performance checks Audio output level adjustments
4	2 min.	Stairstep	1 kHz, -10 dB	Y output level, audio freq. response checks
5	4 min.	Color Bars	10 kHz −10 dB	Color circuit adjustment, Audio freq. response checks, Azimuth adjustment
6	2 min.	Color Sweep	None	Video freq. response checks Limiter/carrier blance checks
7	2 min.	RF Sweep	None	Head resonance adjustments

Table 5-2

5.2 REGULATOR CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the Regulator board.

1. 24 V DC

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to TP-1 of the Regulator board.
3) Confirm that the DC voltage is 24 ± 0.1 V.

2. 12 V DC

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to TP-2 of the Regulator board.
3) Confirm that the DC voltage is 12 V ± 0.2 V.

3. 9 V DC (RF. REG.)

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to TP-4 of the Regulator board.
3) With RF-converter, confirm that the DC voltage is 9 V ± 0.5 V. (CR-6650E, CP-5550E only)

4. 15 V DC (REC. REG.)

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to TP-5 of the Regulator board.
3) Confirm that the DC voltage is 15 V ± 0.5 V.

5.3 SYSTEM CONTROL (SYSCON)

1. 5 V DC

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to IC7-20 of the Syscon board and confirm that the DC voltage becomes 5 ± 0.5 V.

2. IC3 clock frequency

1) In the same manner as above and connect a frequency counter to IC3-1 of the Syscon board.
2) Confirm that the frequency becomes 400 ± 2 kHz and waveform level of more than 5 Vp-p.

3. IC7 clock frequency

1) In the same manner as above and connect a frequency counter to IC7-6 of the Syscon board.
2) Confirm that the frequency becomes 800 ± 2 kHz and waveform level of more than 2.5 Vp-p.

4. Voltage threshold adj.

1) Set for the Stop mode (loading end position).
2) Connect a digital voltmeter to connector P510-6 (variable speed) of the Syscon board.
3) Turn R37 (voltage threshold adj.) of the Syscon board fully counterclockwise.
4) Supply 9.6 V DC voltage to pin 21 of 45 pin remote control connector on the rear panel.
5) Turn R37 (voltage threshold adj.) of the Syscon board slowly clockwise so that the voltage at connector P510-6 rises from high (approx. 9.6 V) to higher (approx. 12 V) when the connector P510-6 voltage exceeds 9.6 V ± 0.05 V.

5. Tape sensor sensitivity

1) Set for the E-E mode (draw operation not performed).
2) Interrupt the start sensor by ND-4 filter or five layers of leader tape.
3) Connect an oscilloscope to TP-1 of the Reel Safety board.
4) Set R26 (START SENSOR ADJ.) of the Reel Safety board to the point where TP-1 changes from high to low.
5) Similarly, interrupt the tape end sensor, connect oscilloscope to TP-1 of the Junction board and adjust R846 (END SENSOR ADJ.) of the Junction board.

5.4 REEL SERVO SYSTEM ADJUSTMENTS

5.4.1 Osc, level

1) Set for the Stop mode (loading end position).
2) Connect an oscilloscope to TP-2 of the Reel Servo board.

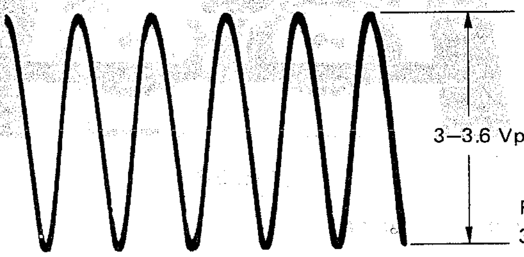


Fig. 5-1

5.4.2 Input level of supply

1) Set for the E-E mode (draw operation not performed).
2) Connect an oscilloscope to TP-1 of the Reel Servo board.
3) Adjust R1 (supply det. level) of the Reel Servo board to obtain a waveform level of 0.7 Vp-p.

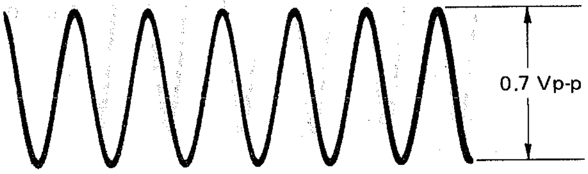


Fig. 5-2

5.4.3 Input level of take-up

1) Set for the E-E mode (draw operation not performed).
2) Connect an oscilloscope to TP-3 of the Reel Servo board.
3) Move the take-up tension roller to the right side to maximize the output of the differential transformer. At this time, adjust R60 (take-up det. level) of the Reel Servo board to obtain a waveform level of 0.7 Vp-p.

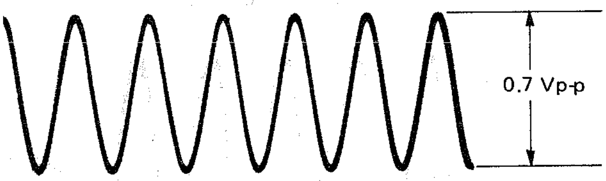


Fig. 5-3

5.4.4 REW torque

Note: Observe that CH-1 and CH-2 ranges are normally equal.

1) Connect a dual trace oscilloscope to TP-1 and TP-2 of the Reel Drive board. Invert one channel and set an oscilloscope to the ADD mode.
2) Insert a cassette from which tape is absent ordinarily, in this case, FF and REW are performed for about 3 seconds, then the cassette is automatically ejected. To defeat this function, at the end of the REW process, operate the power switch intermittently between on and OFF.
3) During REW mode, adjust R2 (supply motor voltage) of the Reel Drive servo board to obtain a waveform level of 120 Vp-p.

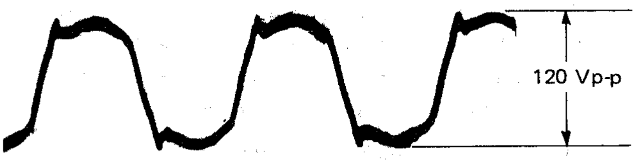


Fig. 5-4

5.4.5 F-F torque

1) In the same manner as above Rew torque.
2) During F-F mode, adjust R14 (take-up motor voltage) of the Reel Servo board to obtain a waveform level of 120 Vp-p.

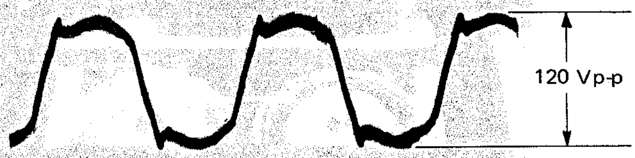


Fig. 5-5

5.4.6 Supply back tension

1) Set the video cassette torque meter (Part No. PUJ-42373) and set for the REC mode.
2) Adjust R15 (SUPPLY TENSION ADJ.) of the Reel Servo board to obtain an indication of 195 g-cm. (At the point [A], 80 ± 5 g-cm as measured with a Tentelometer®).
3) Confirm that the take-up back tension becomes 430 g-cm ± 40 g-cm on the cassette torque meter.
4) In the same manner as above and set for the Playback mode. (Check that SKEW CONTROL is at the center click position.)
5) Adjust R56 (SKEW PRESET) of the Reel Servo board to obtain 195 g-cm.

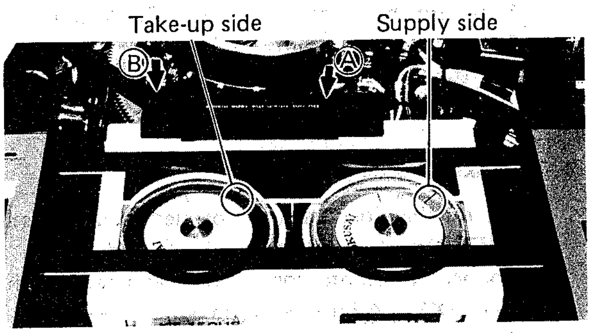


Fig. 5-6

- **Player (CP-5550E)**

1) Set a video cassette torque meter and set for the Playback mode.
2) Connect a remote control unit and set for Search FWD (X1). Adjust R15 (supply tension adj.) of the Reel Servo board to obtain 195 g-cm (At point [A], 85 ± 5 g-cm as measured with a Tentelometer ®).
3) In the same manner as above and set for the Playback mode. (Check that SKEW CONTROL is at the center click position.)
4) Adjust R56 (SKEW PRESET) of the Reel Servo board to obtain 195 g-cm.

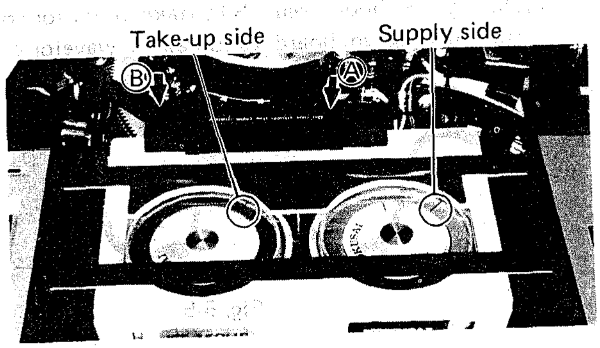


Fig. 5-7

Note: Tape tension measurement

1) **Torque meter**
   (1) Insert the video cassette torque meter and set for the Playback or Record mode.
   (2) After the pinch roller engages, wait about 3 seconds, then read the torque meter values.
   (3) The supply side value indicates the supply tension and the take-up side indicates the take-up tension. Read the values indicated by the red lines of the scales.

2) **Tentelometer**
   (1) Set for the center portion of KCS-20 tape.
   (2) The measured points are [A] and [B] in Fig. 5-6.
   (3) Adjusting method is the same as in case of video cassette torque meter.

5.4.7 Take-up back tension

1) Set for the video cassette torque meter (Parts No. PUJ-42373R) and set for the Playback mode.
2) Connect a remote control unit and set for the Search Rev. (X1). Adjust R76 (take-up tension adj.) of the Reel Servo board to obtain 195 g-cm (At the point [B], 65 ± 3 g-cm as measured with a Tentelometer ®).
3) Confirm that the supply back tension becomes 460 g-cm ± 40 g-cm on the cassette torque meter.

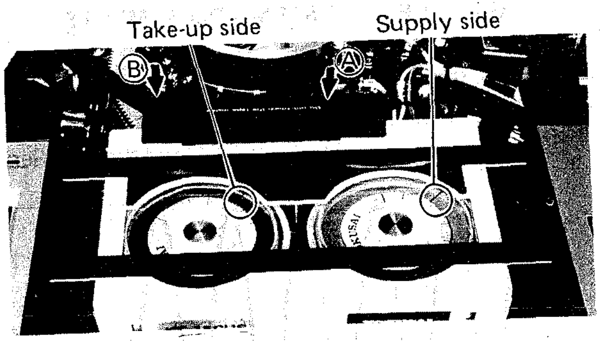


Fig. 5-8

5.4.8 Supply tension detector

1) Connect an oscilloscope to TP-1 of the Reel Servo board.
2) Insert the KCS-20 tape and set for the Playback mode.
3) Confirm that the supply tension level becomes 0.33–0.37 Vp-p as shown in Fig. 5-9.

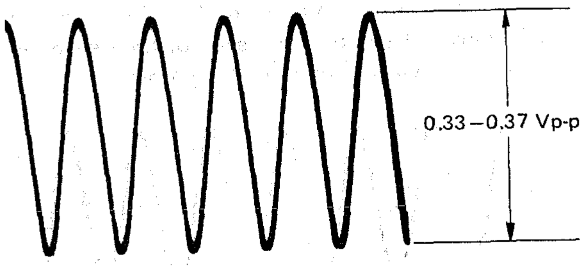


Fig. 5-9

If supply tension level is insufficient, readjust the socket bolt of the supply tension arm. (See section 4.4.16.)

5.4.9 Take-up tension detector

1) Connect an oscilloscope to TP-3 of the Reel Servo board.
2) Insert the KCS-20 tape and connect a remote control unit and set for the Search Rev. (X1).
3) Confirm that the take-up tension level becomes 0.36–0.40 Vp-p as shown in Fig. 5-10.

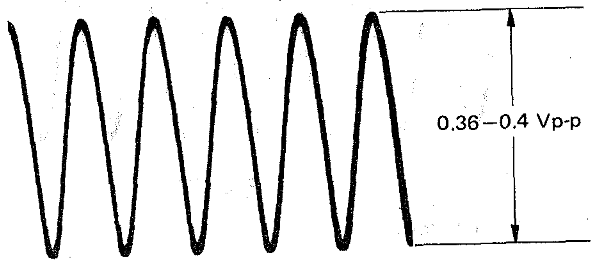


Fig. 5-10

4) If take-up tension level is insufficient, readjust the socket bolt of the take-up tension arm. (See section 4.4.15)

5.5 DRUM SERVO SYSTEM ADJUSTMENTS

5.5.1 Drum discriminator

1. Supply a color bar signal and set for the REC mode.
2. Connect a digital voltmeter to TP-17 of the DRUM SERVO board.
3. Adjust R85 (DISCR) of the DRUM SERVO board to obtain a discriminator voltage of 5.5 ± 0.05 V.
4. Change the digital voltmeter connection from TP-17 to TP-22 of the DRUM SERVO board.
5. Check for phase voltage of 5.5 ± 0.2 V.

Player (CP-5550E)

1. Playback the first segment of aligment tape (MO-2SB).
2. Perform above (Recorder) steps 3 to 5.

5.5.2 Drum ripple

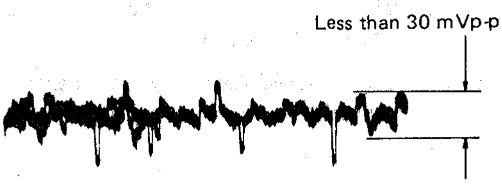


Fig. 5-11

1. Supply a color bar signal and set for the REC mode.
2. Connect an oscilloscope to TP-17 of the DRUM SERVO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Check for a ripple level below 30 mVp-p. Also observe that the negative pulse produced at 30 Hz synchronization cannot be seen.

Player (CP-5550E)

1. Playback the first segment of aligment tape (MO-2SB).
2. Perform above (Recorder) step 3.

5.5.3 Drum pulse level

1. Supply a color bar signal and set for the REC mode.
2. Connect an oscilloscope to TP-13 of the DRUM SERVO board. Trigger the oscilloscope internally.
3. As shown in Fig. 5-12, check for a waveform potential of 6.4 ± 0.6 V and confirm that the top of the pulse is sufficiently sturated.

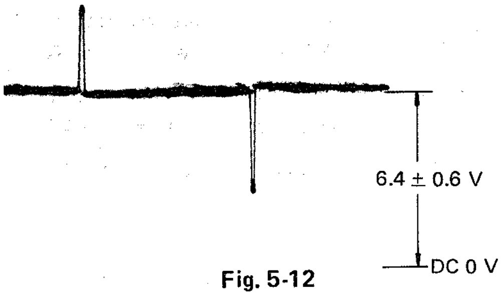


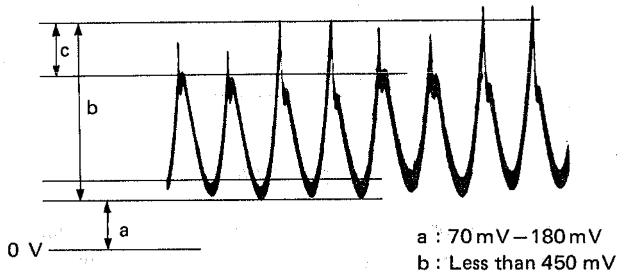
Fig. 5-12

Player (CP-5550E)

1. Playback the first segment of aligment tape (MO-2SB).
2. Perform above (Recorder) step 3.

5.5.4 Drum motor current waveform

1. Supply a color bar signal and set for the REC mode.
2. Connect an oscilloscope to TP-25 and TP-27 of the DRUM SERVO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Confirm waveform as shown in Fig. 5-7.



a : 70 mV – 180 mV
b : Less than 450 mV
c : Less than 120 mV

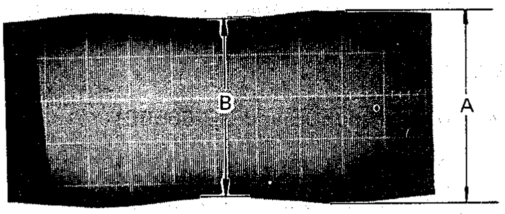
Fig. 5-13

Play (CP-5550E)

1. Playback the first segment of aligment tape (MO-2SB).
2. Perform above (Recorder) step 3.

5.5.5 Drum FG level

1. Supply a color bar signal and set for the REC mode.
2. Connect an oscilloscope to TP-19 of the DRUM SERVO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Confirm that the maximum value of the waveform is more than 0.6 Vp-p. Also, with the maximum value taken as 5, check that the minimum value exceeds 4.5.



A ≧ 0.6 Vp-p, A : B = 5 : more than 4.5

Fig. 5-14

Player (CP-5550E)

1. Playback the first segment of aligment tape (MO-2SB).
2. Perform above (Recorder) step 3.

5.5.6 Switching point

Recorder (CR-8250E and CR-6650E)

Note: Perform the following steps only after completing item 4.5 (CHECKING AND ADJUSTMENT OF THE TAPE TRANSPORT, 4.6 (INTERCHANGEABILITY CHECKS).

1. Play back the first segment of alignment tape (MO-2SB).
2. Connect an oscilloscope to VIDEO OUT. Trigger the oscilloscope externally (+ slope) with the signal from TP-21 of the DRUM SERVO board.

3. Adjust R68 (P.B. SW-2) of the DRUM SERVO board to position the trigger point 6.5 H before V. sync.
4. Change trigger slope of the oscilloscope to minus (–).
5. Adjust R66 (P.B. SW-1) of the DRUM SERVO board to position the trigger point 6.5 H before V. sync.

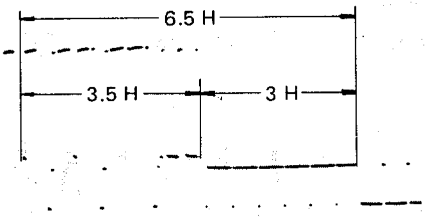


Fig. 5-15

6. Supply a monoscope signal and set for the recording mode. Set the trigger slope of the oscilloscope to plus (+).
7. Adjust R71 (REC SW) to position the switching point 6 H before V. sync.
8. Set the trigger slope of the oscilloscope to minus (–). To align the V. sync phase of the video signal with that observed with plus trigger slope, adjust R66 (P.B. SW-1) of the DRUM SERVO board.

Player (CP-5550E)

1. Perform above (Recorder) steps 1 to 5.
2. Supply a video signal to SYNC IN and set the SYNC switch to EXT.
3. Connect an oscilloscope to TP-8 of the DRUM SERVO board.
4. Perform above (Recorder) steps 7 and 8.

5.5.7 Frame servo

Recorder (CR-8250E and CR-6650E)

1. Supply an input signal and set for the recording mode.
2. Connect an oscilloscope to TP-1 of the DRUM SERVO board. Trigger the oscilloscope externally (– slope) with the signal from TP-21 of the DRUM SERVO board.
3. Set the frame servo switch to OFF and check for a waveform as shown by Fig. 5-16(A).
4. If the waveform appears as Fig. 5-16(B), operate the INPUT SELECT switch to LINE, TV and LINE to obtain waveform (A).

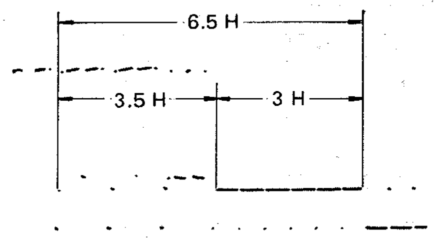


Fig. 5-16(A)

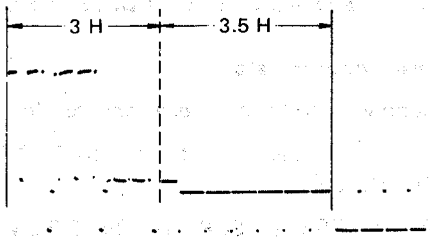


Fig. 5-16(B)

5. Set the frame servo switch to ON and check that the waveform shifts from (A) to (B).
6. If this does not occur, with the frame servo switch ON, adjust R47 (FRAME ADJ) of the DRUM SERVO board so that the waveform shifts from (A) to (B).
7. Connect a dual trace oscilloscope to TP-10 and TP-11 of the DRUM SERVO board. Trigger the oscilloscope externally (– slope) with the signal from TP-21 of the DRUM SERVO board.
8. Adjust R47 (FRAME ADJ) to center the TP-11 pulse with respect to the low level period of the TP-10 waveform.

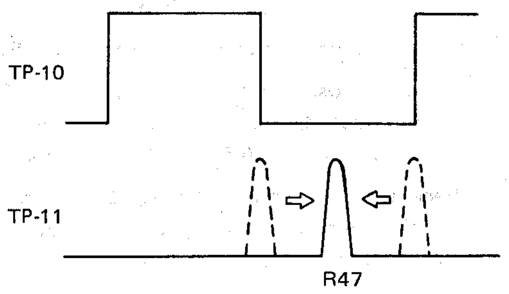


Fig. 5-17

Player (CP-5550E)

1. Set for the Play mode.
2. Connect an oscilloscope to TP-8 of the DRUM SERVO board. Trigger the oscilloscope externally (+slope) with the signal from TP-21 of the DRUM SERVO board.
3. Supply a color bar signal to SYNC IN and set the SYNC switch to EXT.
4. Set the frame servo switch to OFF and check for a waveform such as shown in Fig. 5-16(A).
5. If the (B) waveform appears, operate the SYNC switch EXT - INT - EXT to obtain waveform (A).
6. Operate the frame servo switch from OFF to ON and check that the waveform shifts from (A) to (B).
7. If this does not occur, perform steps 6 to 8 of the above (Recorder) section.

5.5.8 Drum servo lock

1. Connect an oscilloscope to TP-14 of the DRUM SERVO board. Trigger the oscilloscope internally.

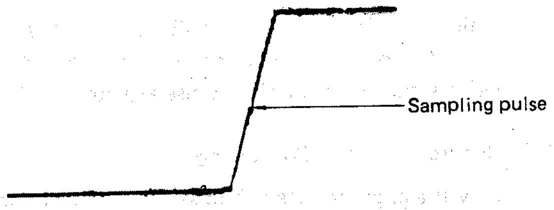


Fig. 5-18

2. Insert an alignment tape and set for the Stop mode. When the PLAY button is pressed, confirm that the pulse stabilizes within 5 seconds.
3. Set SYNC switch to EXT and supply a sync signal to SYNC IN. Confirm that the pulse remains stable within the range of 50 Hz ± 3%.

5.5.9 H. phase adjustment

1. Set for the E-E mode (draw operation not performed).
2. Connect a digital voltmeter to IC14-2 of the DRUM SERVO board.
3. Adjust R136 (H. PHASE ADJ.) of the DRUM SERVO board to obtain DC voltage of 4.5 V ± 0.2 V.

5.6 CAPSTAN SERVO SYSTEM ADJUSTMENTS

5.6.1 Capstan discriminator

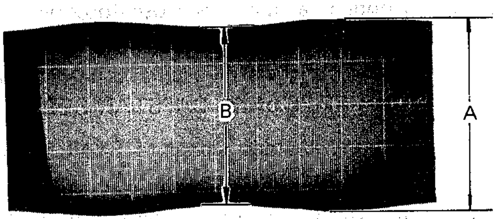
1. Supply a color bar signal and set for the REC mode.
2. Connect a digital voltmeter to TP-21 of the CAPSTAN SERVO board.
3. Adjust R129 (DISCR) of the CAPSTAN SERVO board to obtain a discriminator voltage of 5.25 ± 0.05 V.
4. Connect the digital voltmeter to TP-20 of the CAPSTAN SERVO board.
5. Check for phase voltage of 5.3 ± 0.15 V.

Player (CP-5550E)

1. Play back the first segment of alignment tape (MO-2SB).
2. Perform above (Recorder) steps 3 to 5.

5.6.2 Capstan FG

1. Record and play back a color bar signal. If the player unit (CP-5550E), play the first segment of the alignment tape (MO-2SB).
2. Connect a digital voltmeter to TP-9 of the CAPSTAN SERVO board.
3. Set for the Still mode and adjust R54 (DC SET-2) of the CAPSTAN SERVO board to obtain 7.0 ± 0.2 V.
4. Set for the Playback mode and connect an oscilloscope to TP-9 of the CAPSTAN SERVO board.
5. Check for FG waveform level.



A = 0.3 – 1.8 Vp-p
B ≧ 0.9 A

Fig. 5-19

5.6.3 Symmetry

1. Set for the REC or Play mode.
2. Connect an oscilloscope to TP-10 of the CAPSTAN SERVO board.
3. Adjust R62 of the CAPSTAN SERVO board so that A = B as shown in Fig. 5-20.

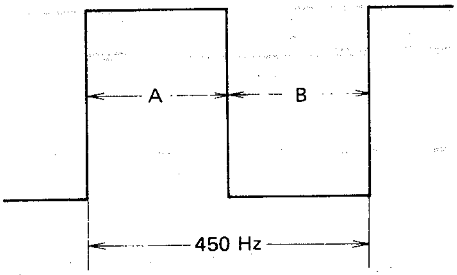


Fig. 5-20

5.6.4 Capstan recording phase - 1

Note: Perform the following steps only after completing item 5.6.5, Tracking Adj.

1. Supply an input signal and set for the Recording mode.
2. Connect a dual trace oscilloscope to TP-18 and TP-17 of the CAPSTAN SERVO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Make a note of the TP-18 waveform rise point.
4. Play back the recorded segment. Adjust R98 (CAP REC PHASE - 1) of the CAPSTAN SERVO board to align the falling point of the TP-17 waveform with the point noted in the above step 3.

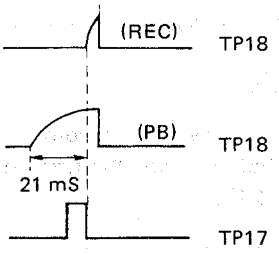


Fig. 5-21

5.6.5 Tracking (Recorder)

Note: Check for the maximum FM level at this time.

1. Record a video signal (monoscope), then play back.
2. Connect a dual trace oscilloscope to TP-6 of the CAPSTAN SERVO board and TP-8 of the DRUM SERVO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Supply a video signal to SYNC IN and set the SYNC switch to EXT.
4. Adjust R111 (SUB TRACKING) of the CAPSTAN SERVO board to align the V. sync component of the video signal with the CTL pulse.

Player (CP-5550E)

1. Connect an oscilloscope to TP-18 of the CAPSTAN SERVO board.
2. Play back the first segment of alignment tape (MO-2SB).
3. Adjust R111 (SUB TRACKING) of the CAPSTAN SERVO board so that T becomes 24.4 msec.

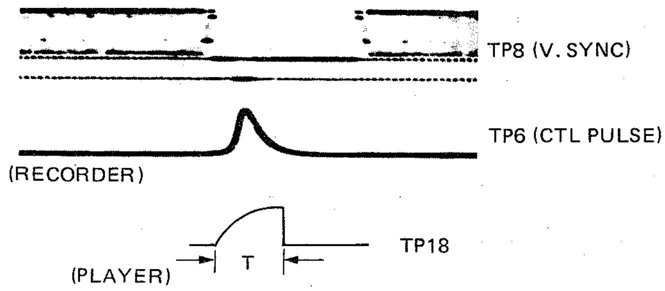


Fig. 5-22

5.6.6 Capstan recording phase - 2

1. Perform the above (Tracking adj.) steps 1 to 3.
2. Supply a high (10 V) voltage to the connector P306-11 (REC MODE IN) of the CAPSTAN SERVO board.
3. Adjust R165 (REC PHASE - 2) of the CAPSTAN SERVO board to align the V. sync component of the video signal with the CTL pulse as shown in Fig. 5-22.

5.6.7 Control amplifier DC setting

1. Play the alignment tape and set for the Still mode.
2. Connect a digital voltmeter to TP-5 of the CAPSTAN SERVO board.
3. Adjust R39 (DC SET-1) of the CAPSTAN SERVO board to obtain 6.3 ± 0.3 V DC.

5.6.8 Still width

1. Insert a tape and set for the Stop mode.
2. Connect a digital voltmeter to TP-14 and TP-27 of the CAPSTAN SERVO board.
3. Adjust R89 (STILL WIDTH) of the CAPSTAN SERVO board to obtain 3.0 V.

5.6.9 Search speed

1. Connect a frequency counter to TP-19 of the DRUM SERVO board.
2. Set KCS-20 cassette. Turn the remote control unit control fully counter-clockwise, then adjust it for the point of transition from the REV to the Still mode.
3. At this time, adjust R7 (X5 SEARCH) of the CAPSTAN SERVO board to obtain 2925 Hz. If this cannot be obtained, set R10 minimum before adjusting.
4. Turn the remote control unit control fully clockwise, then adjust it for the point of transition from the FWD to the Still mode.
5. At this time, adjust R10 (REV x5 SEARCH) of the CAPSTAN SERVO board to obtain 2921 Hz.
6. Turn the remote control unit control first to REV, then Still. Confirm frequency of 2923 ± 9 Hz.

5.6.10 Capstan servo lock

1. Connect an oscilloscope to TP-19 of the CAPSTAN SERVO board. Trigger the oscilloscope internally.
2. Play an alignment tape. Operate from Still mode to Play mode and confirm that the pulse stabilizes within 1 second.

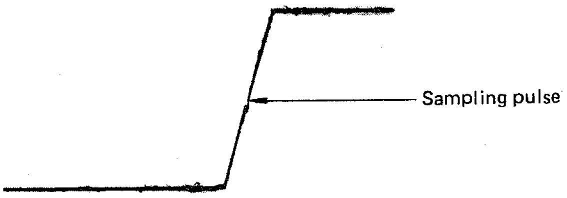


Fig. 5-23

5.7 AUDIO SYSTEM ADJUSTMENTS

5.7.1 E-E level (except for CP-5550E)

1. Supply a 1 kHz –20 dbs audio signal, set the AUDIO INPUT LEVEL switch to –20 dB and set for the E-E mode.

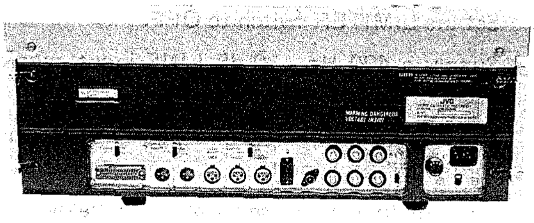


Fig. 5-24

2. Set the AUDIO OUTPUT LEVEL switch to 0 dB and set the INPUT switch to LINE.
3. With LIMITER off, set the REC LEVEL controls to the center positions.
4. With 600 Ω load, adjust R7 (CH-1 EE LEV) and R8 (CH-2 E-E LEV) of the AUDIO P.B. AMP board for 0 dBm output levels.
5. In this condition, adjust R9 (CH-1 METER) and R10 (CH-2 METER) of the AUDIO PB AMP board to obtain 0 dB indications on the level meters.
6. Set the AUDIO INPUT LEVEL switch to 0 dB and confirm that the audio output level becomes –20 dB.

5.7.2 Limiter operation (except for CP-5550E)

1. Set the INPUT LEVEL switch to –20 dB.
2. Set the AUDIO OUTPUT LEVEL switch to 0 dB and set the INPUT switch to LINE.
3. Supply a 1 kHz, –10 dB audio input signal and set for the E-E mode.
4. Set the LIMITER switch to ON.
5. With 600 Ω load, adjust R3 (CH-1 LIMIT LEV.) and R4 (CH-2 LIMIT LEV.) of the AUDIO REC. AMP. board for +2 dBm output levels.
6. Set the LIMITER switch to OFF.

5.7.3 Mic amp level adjustment

1. Set the AUDIO OUTPUT LEVEL switch to 0 dB and set the LIMITER switch to OFF.
2. Supply a 1 kHz, –70 dBm (–70 dBs at 600 Ω load) audio signal to the MIC IN and set the E-E mode.
3. Adjust R1 (CH-1 MIC. LEVEL), R2 (CH-2 MIC. LEVEL) of the AUDIO REC board so that the AUDIO LINE OUTPUT becomes 0 dBm (0 dBs with 600 Ω load).

5.7.4 Playback level

1. Set the AUDIO OUTPUT switch to 0 dB.
2. Play back 1 kHz, 0 dB signal of the MO-2SB alignment tape.
3. Adjust R5 (CH-1 P.B. LEV.) and R6 (CH-2 P.B. LEV.) of the AUDIO playback board for 0 dBm output with 600 Ω load.

5.7.5 P.B. frequency response

1. Set the AUDIO OUTPUT level switch to 0 dB.
2. Play back 1 kHz, –10 dB and 10 kHz, –10 dB signals of the MO-2SB alignment tape.
3. Adjust R1 (CH-1 P.B. EQ) and R2 (CH-2 P.B. EQ) of the AUDIO P.B. board so that the 10 kHz level becomes 0 to 1 dB of the 1 kHz level with 600 Ω load.

5.7.6 Full erase and audio erase (except CP-5550E)

FULL ERASE

1. Connect an oscilloscope to TP-9 of the AUD REC AMP board and set for the REC mode without signal.
2. Set the INPUT SELECT switch to LINE.
3. Check for oscillator frequency of 70 ± 3.5 kHz and output level of more than 60 Vp-p.
4. If output is insufficient, adjust T3 of the AUD REC AMP board.

AUDIO ERASE

5. Connect a dual trace oscilloscope to TP-7 and TP-8 of the AUD REC AMP board.
6. Set for the AUDIO-1 insert (DUB) mode.
7. Turn T1 of the AUDIO REC AMP board fully clockwise, then turn it slowly counterclockwise to obtain maximum level at TP-7.
   Gradually turn T1 of the AUDIO REC AMP board clockwise and set to the point TP-7 becomes 2 volts below maximum level.
8. Set for the AUDIO-2 insert (REC) mode.
9. Turn T2 of the AUDIO REC AMP board fully clockwise. then turn it slowly counterclockwise to obtain maximum level at TP-8.
   If the editor (CR-8250) unit, gradually turn T2 of the AUDIO REC AMP board clockwise and set to the point TP-8 becomes 1 volt below maximum level.
10. Set for the REC mode and connect an oscilloscope to TP7, TP8 of the AUDIO REC AMP board.
11. Confirm that the level is greater than 55 Vp-p and the frequency is 70 kHz ± 3.5 kHz.

5.7.7 Bias level and leakage (except CP-5550E)

1. Connect a dual trace oscilloscope to TP-4 and TP-6 of the AUD REC AMP board and set the REC mode.
2. Adjust R7 (CH-1 BIAS LEV.) and R8 (CH-2 BIAS LEV.) of the AUD REC AMP board to set the bias levels for 110 Vp-p.
3. Without an audio input signal, connect a dual trace oscilloscope to TP-3 and TP-5 of the AUD REC AMP board.
4. Adjust L3 and L4 to minimize bias leakage.

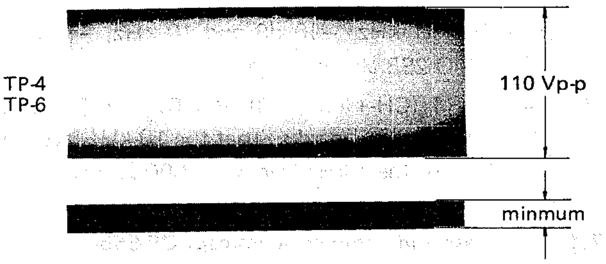


Fig. 5-25

5.7.8 Recording level (except CP-5550E)

1. Set the INPUT LEVEL switch to −20 dB the OUTPUT LEVEL switch to 0 dB and the INPUT SELECT switch to LINE.
2. Set the LIMITER switch to OFF and confirm that the AUDIO LINE OUTPUT level becomes 0 dBm during E-E mode.
3. Supply a 1 kHz −20 dB audio input signal, record and play back.
4. With 600 Ω load, the audio output level during playback becomes 0 dBm ± 0.2 dB, during the Recording mode adjust R5 (CH-1 REC LEV.)
5. Perform adjustment in the same manner as above step 4. Adjust R6 (CH-2 REC LEVEL) of the AUDIO REC AMP board.

5.7.9 Audio inset (except CP-5550E)

1. Without tape, set for the Play mode with cassette switch becomes on. Cover the tape end detector with opaque material to allow operaton.
   Simultaneously press the Rec safety switch and the Edit start button as following steps.
2. Without a LINE input signal, and with only AUD-1 at INSERT, adjust L2 (CH-2 BIAS TRAP) of the P.B. AUDIO board for minimum CH-2 level with 600 Ω load.
3. Similarly, with only AUD-2 at INSERT, adjust L1 (CH-1 BIAS TRAP) for minimum CH-1 level with 600 Ω load.
4. Supply a 1 kHz −20 dB LINE input.
5. With only AUD-1 at INSERT, adjust R4 (CH-2 CT. CANCEL) of the P.B. AUDIO board for minimum CH-2 level with 600 Ω load.
6. Similarly, with only AUD-2 at INSERT, adjust R3 (CH-1 CT. CANCEL) for minimum CH-1 level with 600 Ω load.
7. Omit the above steps 3 and 6 in the case of the CR-6650E.

5.7.10 Erase (except CP-5550E)

1. Set the LIMITER switch to OFF.
2. Supply a 400 Hz −10 dB LINE input, record and play back.
3. During playback, without a signal at CH-1 or CH-2, set for the INSERT mode.
4. Confirm that the erased segment is below −50 dB with respect to the unerased segment with 600 Ω load.

5.7.11 Signal to Noise ratio (except CP-5550E)

1. Set the INPUT LEVEL switch to −20 dB and the OUTPUT LEVEL switch to 0 dB.
2. Set the LIMITER switch to off and the INPUT SELECT switch to LINE.
3. Confirm that the AUDIO LINE OUTPUT LEVEL becomes 0 dBm during E-E mode.
4. In sequence, record a 1 kHz −20 dB LINE input, then with no signal at the LINE input.
5. Play the recordings and confirm a LINE output level difference of below −44 dB with 600 Ω load.

5.7.12 REC/Play frequency response

1. Set the INPUT LEVEL switch to −20 dB, the OUTPUT LEVEL switch to 0 dB, the INPUT SELECT switch to LINE and the LIMITER switch to OFF.
2. In sequence, supply audio input signals of 50 Hz, 100 Hz, 1 kHz, 10 kHz and 15 Hz at −30 dB. Record, then play back these signals.
3. During recording mode, adjust L1 (CH-1) and L2 (CH-2) of the AUDIO REC board to obtain the frequency response shown in the Table 5-3.
4. In sequence, supply audio input signals of 1 kHz and 10 kHz at −20 dB, record and play back. Confirm level fluctuations indicated below.

   1 kHz : Within ±1 dB
   10 kHz : Within ±2 dB

   Set the 1 kHz signal for 0 dB reference signal.

Frequency	Level (dB)
50 Hz	+2 −10
100 Hz	±2
10 kHz	±2
15 kHz	+2 −4

Table 5-3

5.8 VIDEO SYSTEM ADJUSTMENT

5.8.1 4.43 MHz oscillator

1. Set for the Stop mode (loading end position) and connect a frequency counter to TP-19 of the COLOR PROCESS AMP board.
2. Adjust C93 for 4.433619 MHz ± 10 Hz.

5.8.2 5.12 MHz oscillator (except CP-5550E)

1. Connect a frequency counter to TP-1 of the MODULATOR AMP board.
2. Adjust C6 for a frequency of 5.119166 MHz ± 10 Hz.

5.8.3 AGC level (except CP-5550E)

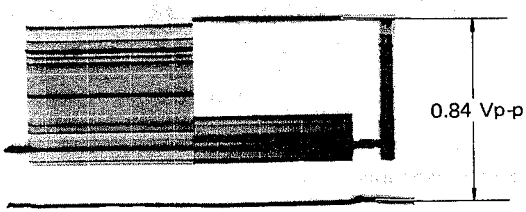


Fig. 5-26

1. Supply a color bar signal and set for the E-E mode.
2. Connect an oscilloscope to TP-12 of the MODULATOR AMP board.
3. Adjust R70 (AGC LEV SET) to obtain 0.84 ± 0.01 Vp-p.

5.8.4 Level meter adj.

1. Supply a color bar signal to VIDEO IN and set for the E-E mode (draw operation not performed).
2. Set the AGC switch to ON.
3. Adjust R850 (METER ADJ.) of the JUNCTION board to obtain green zone indication on the level meter as shown in Fig. 5-27.

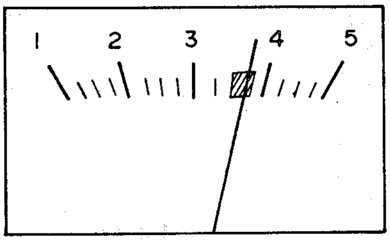


Fig. 5-27

5.8.5 Carrier and deviation (except CP-5550E)

1. Turn R111 (WHITE CLIP) and R107 (DARK CLIP) so that clipping does not occur.
2. Supply a color bar signal and set for the E-E mode.
3. Connect an oscilloscope to TP-8 of the PB VIDEO board.
4. Apply an external 3.8 MHz signal to TP-2 of the PB VIDEO board.
5. Adjust C80 of the MODULATOR AMP board to set the carrier as shown in Fig. 5-28.
6. Apply an external 5.4 MHz signal to TP-2 of the PB VIDEO board.
7. Set the VIDEO MODE switch to AUTO and adjust R83 (COLOR DEVI) of the MODULATOR AMP board to set the deviation as shown in Fig. 5-28.
8. Set the VIDEO MODE switch to B/W and adjust R76 (B/W DEVI) of the MODULATOR AMP board to set the deviation as shown in Fig. 5-28.

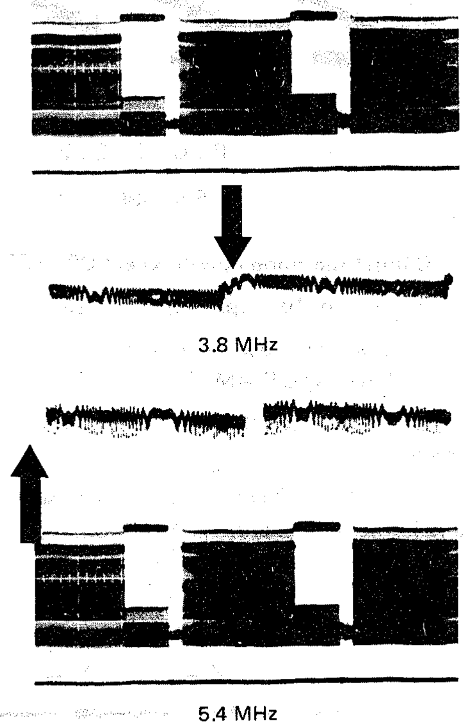


Fig. 5-28

5.8.6 Symmetry

1. Supply a 1 Vp-p monoscope signal from the video signal generator to VIDEO IN.
2. Set "VCR" for the Stop mode.
3. Adjust R98 (SYMMETRY ADJ.) of the MODULATOR AMP so that the picture on a monitor TV shows no leakage as shown in Fig. 5-29.

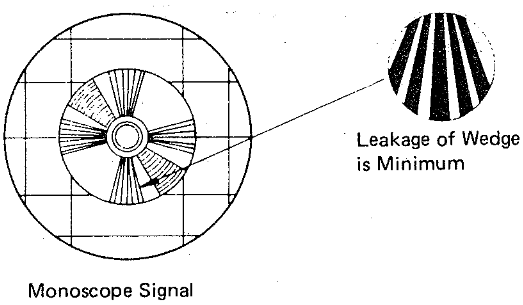
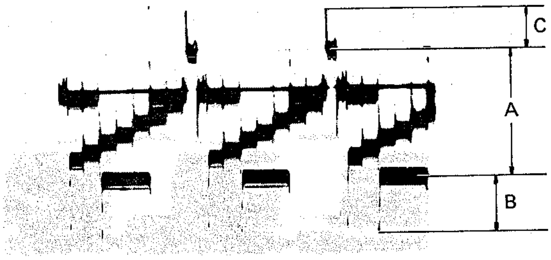


Fig. 5-29

5.8.7 White and dark clip (except CP-5550E)

1. Supply a color bar signal and set for the E-E mode.
2. Connect an oscilloscope to TP-14 of the MODULATOR board.
3. As shown in Fig. 5-30, adjust R111 (WHITE CLIP) and R107 (DARK CLIP).



A : B : C = 5 : 2 : 2

Fig. 5-30

5.8.8 REC burst sampling pulse (except CP-5550E)

1. Supply a color bar input signal and set for the E-E mode.
2. Connect a dual trace oscilloscope to TP-3 and TP-10 of the MODULATOR AMP board.
3. Adjust L6 to align the tip of the pulse with the center of the burst.
4. Change the TP-10 connection of the oscilloscope to TP-4 and in the same manner, adjust L5.

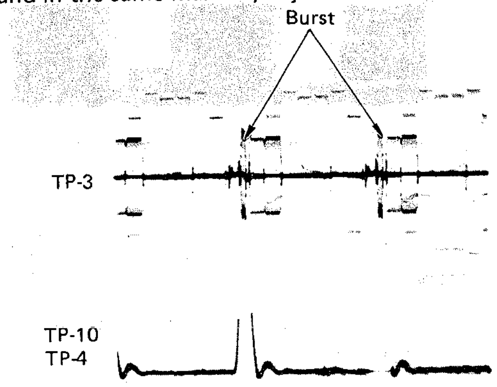


Fig. 5-31

5.8.9 REC color killer (except CP-5550E)

1. Supply a color bar signal and set for the E-E mode.
2. Connect an oscilloscope to TP-7 of the MODULATOR board.
3. Turn LC1 fully counterclockwise and turn it clockwise to obtain maximum voltage (about 11.5 V) at TP-7 of the MODULATOR board as shown in Fig. 5-32.
4. Connect the jig circuit shown in Fig. 5-33 between TP-4 and GND. Set the VIDEO MODE switch to AUTO.
5. Confirm presence of chroma signal at TP-4 of the MODULATOR board. Adjust R1 of the jig circuit to obtain one half the from chroma signal level.
6. Confirm that the DC voltage of TP-7 drops below 9.5 V.
7. Change the oscilloscope connection from TP-4 to TP-8, and set R42 (KILLER SET) of the MODULATOR board to the point where TP-8 changes from low to high.
8. After adjusting, disconnect the jig.

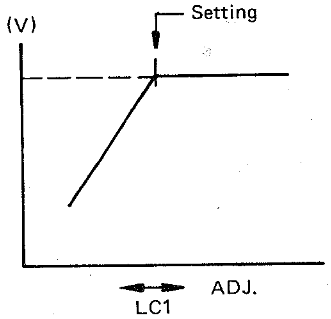


Fig. 5-32

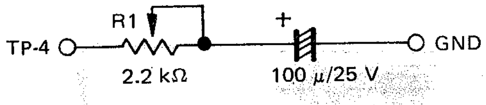


Fig. 5-33

5.8.10 Head resonance

1. Set for the Stop mode and apply an attenuated video sweep signal (with 1 MHz and 5.8 MHz markers) to TP-4 and TP-5 of the HEAD AMP board.
2. Connect an oscilloscope to TP-8 and TP-6 (GND) of the HEAD AMP board.
3. Adjust C48 (Q. ADJ.) to set the resonance point to the 5.8 MHz marker.
4. Use the controls of the oscilloscope to set the gain of the 100 kHz region to 2 scale division. At this time, adjust R81 to set the 5.8 MHz region to 8 scale divisions. See Fig. 5-34.
5. Apply the sweep signal to TP-3 and TP-5 and connect the oscilloscope to TP-7 and TP-6 of the HEAD AMP board.
6. In the same manner as above steps 3 and 4, adjust R80 (Q. ADJ.) and C47.

   CP-5550E: In this case, the adjustment procedures are the same, but the connections and controls are as indicated in Table 5-4.

	Sweep Signal	Oscilloscope	Resonance Point	Q. Adj.
CH-1	TP-4	TP-8	C48	R81
CH-2	TP-3	TP-7	C47	R80

Table 5-4

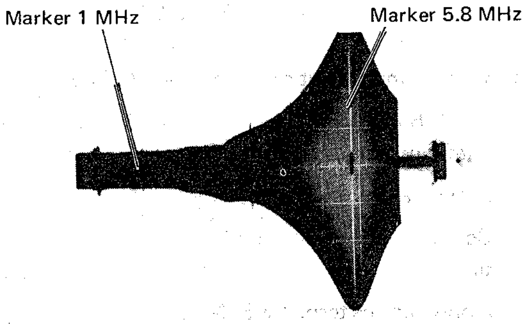


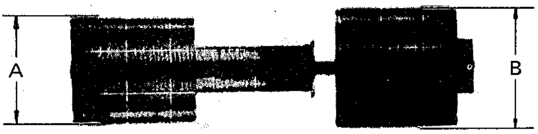
Fig. 5-34

5.8.11 Color balance and level

- Set the tracking control for optimum level.

1. Play color bar segment of alignment tape.
2. Connect an oscilloscope to TP-1 of the COLOR PROCESS board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Adjust R100 (PB COLOR BALANCE) of the HEAD AMP board to align the CH-1 and CH-2 levels.
4. Adjust R1 (PB LEVEL) of the COLOR PROCESS board for a waveform level of 0.25 ± 0.01 Vp-p.

   Note: For the CP-5550E, adjust balance with R100 (PB COLOR BALANCE) of the HEAD AMP board and R1 of the COLOR PROCESS board for 0.30 ± 0.01 Vp-p.



A = B = 0.25 Vp-p for Recorder
A = B = 0.3 Vp-p for Player

Fig. 5-35

5.8.12 REC FM level (except CP-5550E)

Note: Perform the following steps only after completing item 5.8.23 "REC FM EQ".

Before adjustment, if the voltage at TP-2 of the HEAD AMP exceeds the range between 4 V and 6 V, after adjusting REC FM LEVEL, confirm that the REC FM EQ is sufficient.
If the REC FM EQ is not fulfilled, readjust R27 and R101.

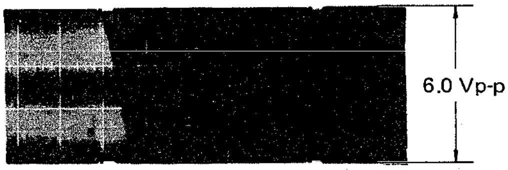


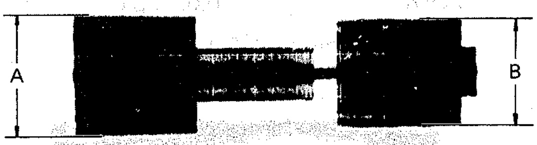
Fig. 5-36

1. Supply a color bar signal and set for the REC mode.
2. Connect an oscilloscope to TP-2 of the HEAD AMP board and set the VIDEO MODE switch to AUTO or COLOR.
3. Adjust R27 (FM REC LEVEL) of the HEAD AMP board to obtain 6.0 ± 0.05 Vp-p.
4. Set the VIDEO MODE switch to B/W and adjust R101 (FM REC LEVEL) of the MODULATOR board to obtain 6.0 ± 0.05 Vp-p.

5.8.13 REC color balance and level (except CP-5550E)

Note: Perform the following steps only after completing item 5.8.23 "REC FM EQ".

1. Supply a color bar signal, record and play back.
2. Connect an oscilloscope to TP-1 of the COLOR PROCESS board.
3. During recording, adjust R73 (REC COLOR BALANCE) of the HEAD AMP board to align the CH-1 and CH-2 levels (i.e., adjust during recording and check during playback).
4. Similarly, during recording, adjust R26 (COLOR REC LEV) of the HEAD AMP board for an output level of 0.36 ± 0.02 Vp-p.



A = B = 0.36 Vp-p

Fig. 5-37

5.8.14 FM DUB REC level (except CP-5550E)

1. Supply a color bar signal and set for the REC mode.

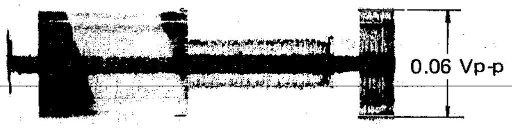


Fig. 5-38(A)

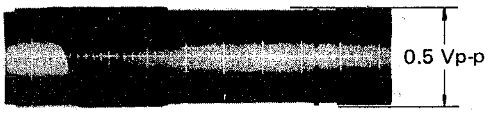


Fig. 5-38(B)

2. Supply FM signal (FM: 0.5 Vp-p, color: 0.06 Vp-p, terminate with 75 Ω) to FM DUB IN.
3. Connect a dual trace oscilloscope to TP- 2 of the HEAD AMP board and TP-1 of the COLOR PROCESS board.
4. Operate the INPUT SEL. switch between LINE and FM DUB. Adjust R1 (DUB REC LEV) and R16 (LEV BAL) of the HEAD AMP board to align the FM level of TP-2 and color level of TP-1 with LINE.
5. On a color monitor, check for absence of difference between LINE and FM DUB.

5.8.15 P.B. FM level

Note: Perform the following steps only after completing item 5.8.22 "P.B. FM EQ".

- If the levels of CH-1 and CH-2 differ, adjust the higher level channel to match the lower by using R80 and R81 of the HEAD AMP.
- Set the TRACKING control for optimum level.

1. Supply a color bar input signal, record and play back. If CP-5550E, play the fifth segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-2 of the PB VIDEO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Adjust R1 (PB FM LEVEL) of the PB VIDEO board for a waveform level of 0.5 ± 0.02 Vp-p.

* If CP-5550E, adjust for 0.4 ± 0.02 Vp-p.

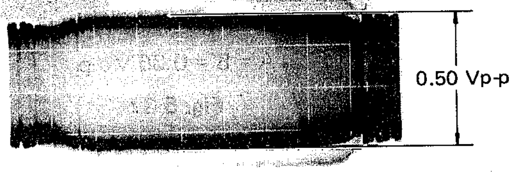


Fig. 5-39

5.8.16 Converter balance

1. Supply a color bar signal and set for the E-E mode. If CP-5550E, play the fifth segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-2 of the COLOR PROCESS AMP board.
3. Adjust R7 (CONV. BAL.) for minimum noise component.
4. Observe the diaplay on a color monitor and check for absence of beat.

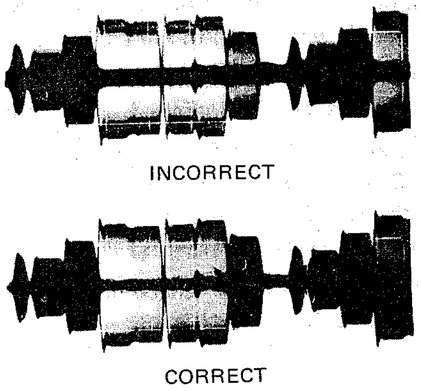


Fig. 5-40

5.8.17 Limiter and carrier balance

1. Supply a stairstep input signal and set for the E-E mode. For the CP-5550E, play the fourth segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-5 of the PB VIDEO board.
3. Alternately adjust R27 (LIMIT BAL) and R38 (CARR BAL) of the PB VIDEO board to minimize H sync carrier leak.

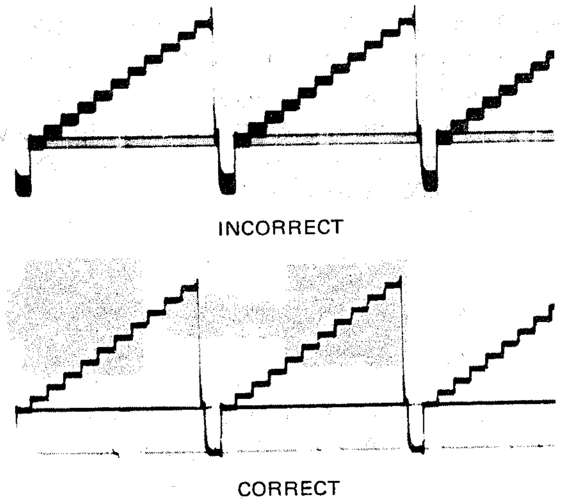
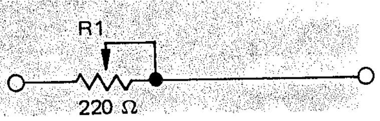


Fig. 5-41

5.8.18 P.B. color killer

1. Supply a color bar input signal and set for the E-E mode. Set the VIDEO MODE switch to AUTO. If the CP-5550E, play the fifth segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-1 of the COLOR PROCESS board.
3. Connect the jig circuit shown in Fig. 5-42 between TP-1 of the COLOR PROCESS board and GND, and adjust R1 of the jig circuit to obtain 0.06 Vp-p.



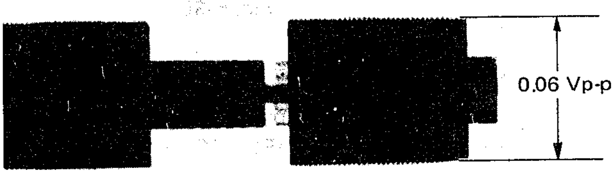


Fig. 5-42

4. Change the oscilloscope connection from TP-1 to TP-8. Set R62 (KILLER SET) of the COLOR PROCESS board to the point where TP-8 changes from low to high (stable 2.5 V).

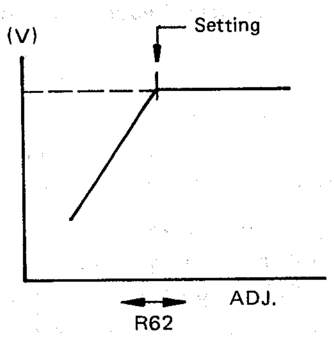


Fig. 5-43

5. After adjusting, disconnect the jig.

5.8.19 Color lock adj.

1. Supply a color bar signal and set for the E-E mode. If CP-5550E, play the fifth segment of the alignment tape (MO-2SB).
2. Set the color DUB switch to OFF.
3. Connect the VIDEO output to TV monitor.
4. Set the VIDEO MODE switch to COLOR and the COLOR LOCK control to the center click position.
5. Connect a digital voltmeter to TP-11 of the COLOR PROCESS AMP board.
6. Vary the setting of R66 (SUB COLOR LOCK) and measure the voltages V1 and V2 where the hue returns to normal (two places).
7. Set R66 to the point of (V1 + V2)/2.

5.8.20 Still pulse width

1. Supply a color bar signal, record and play back. Trigger the oscilloscope internally. If CP-5550E, play color bar segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-1 of the HEAD AMP board.
3. Set for the Still mode. Adjust R20 & R23 (PULSE WIDTH) so that width of falling edge of the pulse becomes less than 700 ± 20 μsec.

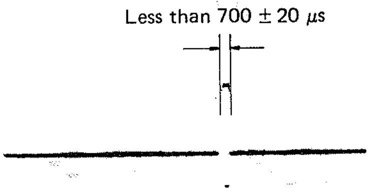


Fig. 5-45

5.8.21 Video output level

1. Supply a color bar input signal, record and play back. If CP-5550E, play color bar segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to VIDEO OUT (terminate at 75 Ω) and set the VIDEO mode to AUTO or COLOR.
3. Adjust R48 (COLOR VIDEO LEVEL) of the PB VIDEO board for a luminance signal level of 1.0 ± 0.4 Vp-p.
4. Adjust R86 (COLOR LEVEL) for a burst level of 0.27 ± 0.02 Vp-p.
5. Set the VIDEO MODE switch to B/W and adjust R41 (B/W LEVEL) for a luminance level of 1.0 ± 0.04 Vp-p.

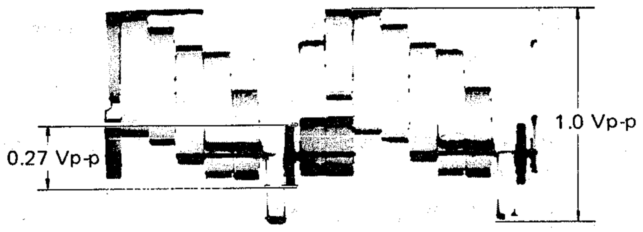


Fig. 5-46

5.8.22 P.B. FM EQ

1. Play the sixth segment of the alignment tape (MO-2SB).
2. Connect an oscilloscope to TP-5 of the PB VIDEO board. Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
3. Use the controls of the oscilloscope to position the 100 kHz region at scale graduation 5 of the oscilloscope screen. Adjust R6 (FREQ. ADJ.) of the PB VIDEO board to position the 2 MHz portion at 3.5—4.7 of the oscilloscope graduations.
4. If the 2 MHz levels of CH-1 and CH-2 differ, adjust the higher level channel to match the lower by using R80 and R81 of the Head amp.

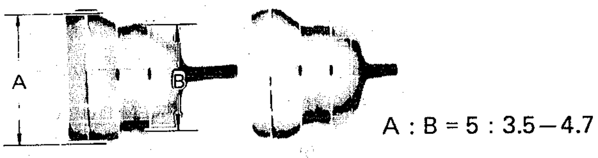


Fig. 5-47

5.8.23 REC FM EQ (except CP-5550E)

Note: Perform the following steps only before completing items 5.8.12 "REC FM Level", 5.8.13 "REC Color Balance and Level".

1. Supply a color sweep input signal, record and play back.
2. Connect an oscilloscope to TP-5 of the PB VIDEO board. Trigger the oscilloscope externally (— slope CH-1, + slope CH-2) with the signal from TP-25 of the CAPSTAN SERVO board.

3. Use the controls of the oscilloscope to position the 100 kHz region at graduation 5 of the oscilloscope scale. Adjust R44 (REC FREQ) of the HEAD AMP board to position 2 MHz at scale graduation 3.4 to 4.2.

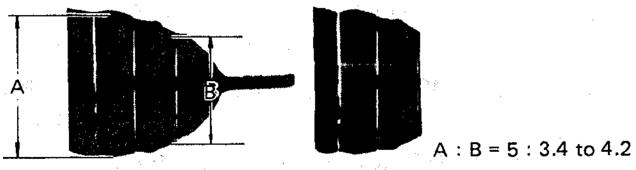


Fig. 5-48

5.8.24 Tracking meter adjustment

Note: Perform the following steps only after completing item 5.8.15 PB FM level.

1. Record and play back a color bar signal.
2. Adjust (TRACKING VR) so that the meter points to maximum.
3. Adjust R128 (TRACKING DC LEVEL) of the Head amp board to obtain 3.5 (3.0 for player) indication on the tracking meter. If CP-5550E, play back the color bar segment of alignment tape.

5.8.25 FM dubbing limiter balance adjustment

1. Connect the equipment as shown in Fig. 5-49.
2. Supply a stairstep signal and set for the E-E mode (Adj. Machine).

   For the CP-5550E, play back the fourth segment of the alignment tape (MO-2SB).
3. Connect an oscilloscope to TP-5 of the P.B. VIDEO board (Ref. Machine).
4. Alternately adjust R114 (LIMIT BAL) and R132 (LIMIT BAL) of the P.B. VIDEO board (Adj. Machine) to minimize H. sync carrier leak as shown in Fig. 5-50.

5.8.26 FM dubbing system frequency response

Note: FM dubbing adjustment requires the use of reference recorder (CR-8250E or CR-6650E).
Before adjusting, check that the reference machine (capable of recording) meets the conditions indicated in the following Table 5-5.

1. Disconnect the connector P123 of the Head amp board and supply a sweep signal with 4.8 MHz to TP-1 of the P.B. VIDEO amp board (adjustment machine).
2. Connect an oscilloscope to TP-10 of the P.B. VIDEO amp board and adjust L22 of the P.B. VIDEO board so that the level of the 4.8 MHz becomes minimum (adjustment machine).
   After adjusting, connect the connector P123.

   Note: Perform the following steps only after completing item 5.8.10 Head resonance.
3. Connect the equipment as shown in Fig. 5-51.
4. On the machine to be adjusted, play the color sweep signal of alignment tape (MOV-7).
5. On the reference machine, set the INPUT select switch to FM DUB and the SYNC switch to EXT. Set for the Recording mode.
6. Connect an oscilloscope to TP-5 (P.B. VIDEO) of the reference machine. Trigger the oscilloscope externally with the signal from TP-25 of the (adjustment machine) CAPSTAN SERVO board.
7. Use the controls of the oscilloscope to position the 0 Hz region at graduation 5 of the oscilloscope scale. At this time, adjust R124 (DUB EQ2) of the (adjustment machine) P.B. VIDEO board so that the 0.5 MHz region is 0.2 (2/10ths) of a scale division larger than the 1 MHz region.
8. Adjust R122 (DUB EQ1) of the P.B. VIDEO board to set the 2 MHz region to about 4 scale divisions.

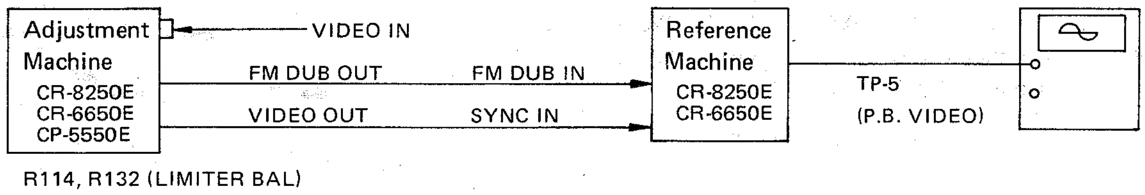


Fig. 5-49

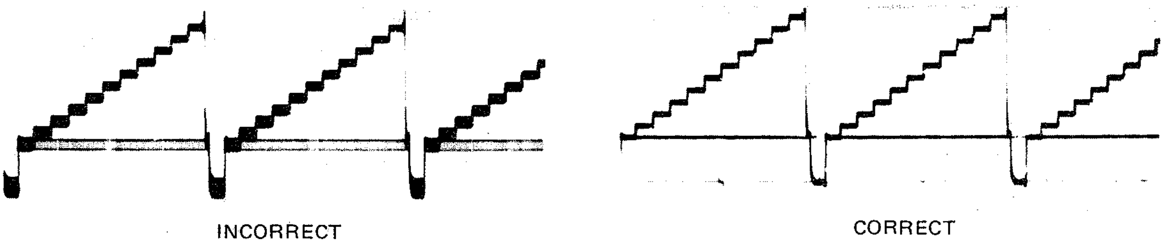


Fig. 5-50

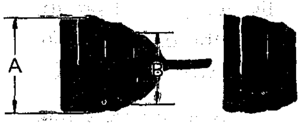
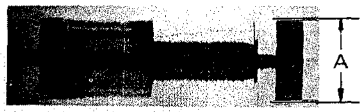
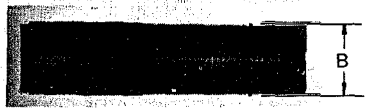
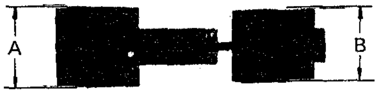
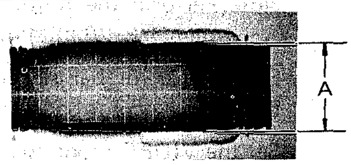
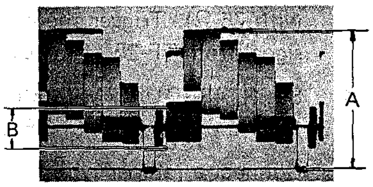
No.	Item	Check point	Adjustment parts	Signal	Mode	Description & Waveform
1	REC FM EQ	TP-5 (PB VIDEO)	See Sec. 5.8.23.	Color Sweep	Record and Playback	 A : B = 5 : 3.4–4.2
2	FM DUB REC Level	TP-1 (COLOR) TP-2 (HEAD AMP)	See Sec. 5.8.14.	Color Bar	Record and Playback	 A = 0.06 ± 0.005 Vp-p  B = 0.5 ± 0.02 Vp-p
3	REC Color Balance and Level	TP-1 (COLOR)	See Sec. 5.8.13.	Color Bar	Record and Playback	 A = B = 0.36 ± 0.04 Vp-p
4	PB FM Level	TP-2 (PB VIDEO)	See Sec. 5.8.15.	Color Bar	Record and Playback	 A = 0.5 ± 0.07 Vp-p
5	Video Output Level	VIDEO OUT (Terminate at 75 Ω)	See Sec. 5.8.21.	Color Bar	Record and Playback	 A = 1 ± 0.1 Vp-p B = 0.27 ± 0.03 Vp-p
6	Head Resonance		See Sec. 5.8.10.			

Table 5-5

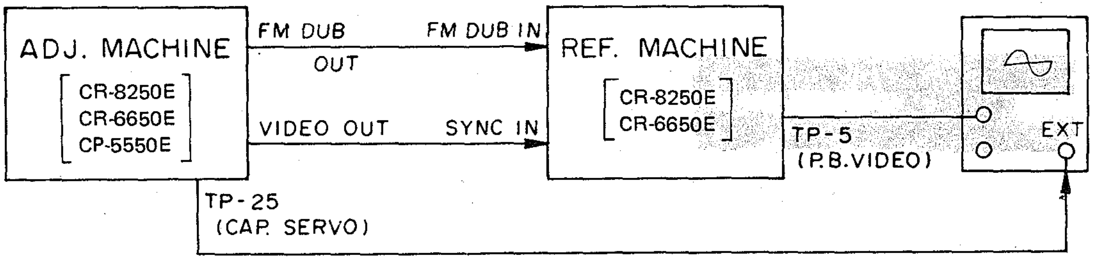

ADJ. MACHINE
CR-8250E
CR-6650E
CP-5550E
FM DUB OUT
FM DUB IN
VIDEO OUT
SYNC IN
REF. MACHINE
CR-8250E
CR-6650E
TP-5 (P.B.VIDEO)
EXT
TP-25 (CAP. SERVO)

Fig. 5-51

9. Play back the recording (on the reference machine) and check that the 2 MHz region is between 3.5 to 4.2 scale divisions, and that the 1 MHz region is slightly smaller than the 0.5 MHz. The overall waveform should appear as shown in Fig. 5-52.
10. If this is not obtained, repeat the adjustments of R124 for the 1 MHz region and R122 for the 2 MHz region.

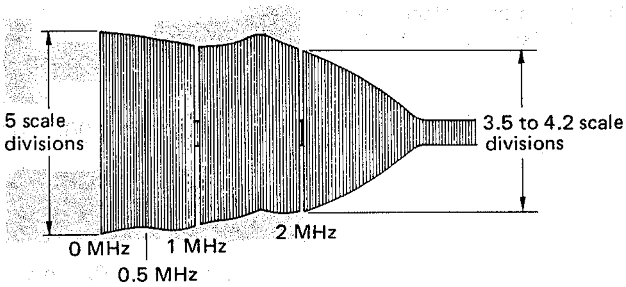


Fig. 5-52

5.8.27 FM DUB output level

Note: Perform the following steps only after completing item 5.8.26 "FM dubbing frequency response".

1. Supply a color bar signal, record and play back. If CP-5550E, play color bar segment of the alignment tape.
2. Set the VIDEO mode switch to AUTO.
3. Connect an oscilloscope to FM DUB OUT (terminate with 75 Ω). Trigger the oscilloscope externally with the signal from TP-25 of the CAPSTAN SERVO board.
4. Set R143 (DUB FM LEVEL) of the P.B. VIDEO board for FM output level of 0.5 Vp-p.
5. Connect a jumper wire between TP-14 and TP-15 of the P.B. VIDEO amp board.
6. Adjust R159 (DUB COL. LEVEL) for 0.06 Vp-p color level.

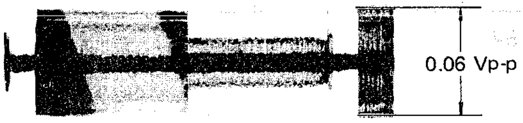


Fig. 5-53

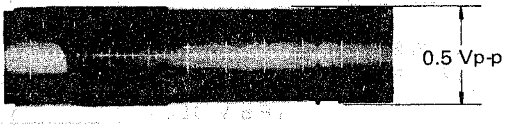


Fig. 5-54

5.8.28 Aperture

Note: Perform after adjusting 5.8.22 "PB FM EQ" and 5.8.23 "REC FM EQ".

1. Supply a color sweep input signal, record, then play back and set for the SW-1 of the PB VIDEO AMP board to ON.
   For the player (CP-5550E), play the sixth segment of alignment tape.
2. Connect a dual trace oscilloscope to TP-5 of the PB VIDEO board and VIDEO OUTPUT (75 Ω termination) and set an oscilloscope to the ADD mode.
3. Adjust R76 (APERTURE) of the PB VIDEO board so that the frequency response at VIDEO OUTPUT (75 Ω termination) becomes the same as that at TP-5 of the PB VIDEO board.
4. After adjusting, set the SW-1 to OFF.

5.8.29 Monochrome RF level

1. Connect an oscilloscope to TP2 of the HEAD AMP board and supply a color bar signal to VIDEO IN. Set for the REC mode.
2. Set the VIDEO MODE SWITCH to B/W and adjust R101 (MONOCHROME RF LEVEL) of the MODULATOR board to obtain 5.2 Vp-p.

5.9 COLOR FRAME ADJUSTMENT (CR-8250E only)

- **Preparation**

Unless otherwise noted, perform adjustment under the following conditions.

COLOR FRAME switch: ON
Input signal : Color bar (1 Vp-p)
Playback tape : Includes recorded frame signal; capable of time code indication
Output voltage from board: 11 ± 1 V

5.9.1 Oscillator frequency

1. Connect a frequency counter to TP-62 of the COLOR FRAME SERVO board and confirm that the oscillator frequency becomes 1 ± 0.01 MHz.

5.9.2 Input burst gate pulse position

1. Supply a color bar signal to VIDEO IN and connect oscilloscope to TP-2 of the COLOR FRAME SERVO board and adjust coil L1 of the COLOR FRAME SERVO board to position the burst at the center of the gate pulse as shown in Fig. 5-55.

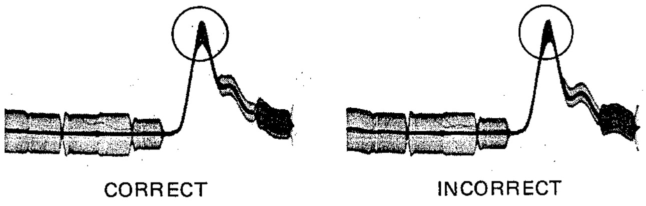


Fig. 5-55

5.9.3 Playback burst gate pulse position

1. Play back the fifth segment of alignment tape (MO-2SB) and connect oscilloscope to TP-15 of the COLOR FRAME SERVO board and adjust L3 of the COLOR FRAME SERVO board to position the burst gate pulse at the center of the gate pulse as shown in Fig. 5-55.

5.9.4 Input burst tuning

1. Supply a color bar signal to VIDEO IN and trigger the oscilloscope externally with signal from TP-9 of the COLOR FRAME SERVO board and observe the waveform at TP-5 of the COLOR FRAME SERVO board. Adjust LC1 and L2 of the COLOR FRAME SERVO board for maximum (signal) and minimum (noise) as shown in Fig. 5-56.

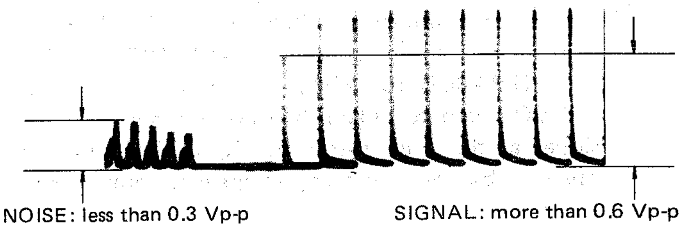


Fig. 5-56

5.9.5 Playback burst tuning

1. Play back the fifth segment of alignment tape (MO-2SB). Trigger the oscilloscope externally with signal from TP-22 of the COLOR FRAME SERVO board and observe the waveform at TP-18 of the COLOR FRAME SERVO board. Adjust LC2 and L4 of the COLOR FRAME SERVO board for maximum (signal) and minimum (noise) as shown in Fig. 5-56.

5.9.6 Input voltage threshold

1. Adjust R15 (INPUT VOLTAGE THRESHOLD) of the COLOR FRAME SERVO board to obtain 0.35 ± 0.05 V at TP-6 of the COLOR FRAME SERVO board.

5.9.7 P.B. voltage threshold

Adjust R37 (PB VOLTAGE THRESHOLD) of the COLOR FRAME SERVO board to obtain 0.35 ± 0.05 V at TP-19 of the COLOR FRAME SERVO board.

5.9.8 Input 3/4 pulse

1. Supply a color bar signal to VIDEO IN and adjust R20 (INPUT 3/4 PULSE) of the COLOR FRAME SERVO board to obtain 45 ± 1 μsec at TP-10 of the COLOR FRAME SERVO board as shown in Fig. 5-57.

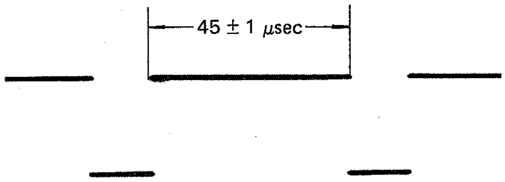


Fig. 5-57

5.9.9 Playback 3/4 pulse

1. Play back the fifth segment of alignment tape (MO-2SB) and adjust R42 (PB 3/4 PULSE) of the COLOR FRAME SERVO board to obtain 45 ± 1 μsec at TP-23 of the COLOR FRAME SERVO board as shown in Fig. 5-57.

5.9.10 Trapezoidal waveform

1. Connect oscilloscope to TP-39 of the COLOR FRAME SERVO board. Adjust R47 (TRAPEZOID ADJ.) and R49 (TRAPEZOID ADJ.) of the COLOR FRAME SERVO board to obtain the waveform and the plateau slopes at the angle shown in Fig. 5-58. At this time, *observe absence of clipping at the waveform inflection points.*

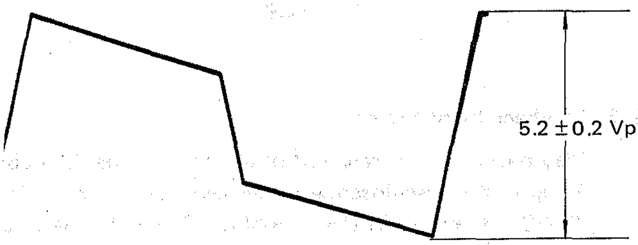


Fig. 5-58

5.9.11 Error adjust

1. Set the COLOR FRAME SERVO switch to ON with the unit in the playback mode. Connect one channel of a dual trace oscilloscope to TP-20 of the CAPSTAN SERVO board and the other channel to TP-13 of the COLOR FRAME SERVO board.
2. Operate the INPUT SELECT switch (VIDEO to LINE to VIDEO) to obtain the same level for TP-20 and TP-13 waveforms.
3. Adjust R58 (ERROR ADJ.) of the COLOR FRAME SERVO board to obtain 5.3 ± 0.2 V as shown in Fig. 5-59.

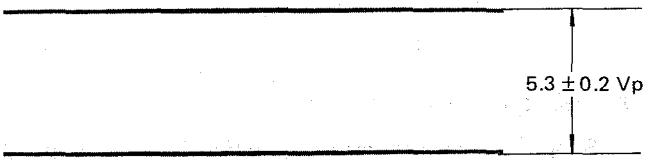


Fig. 5-59

SECTION 6
CHARTS AND DIAGRAMS

6.1 KEY TO ABBREVIATIONS

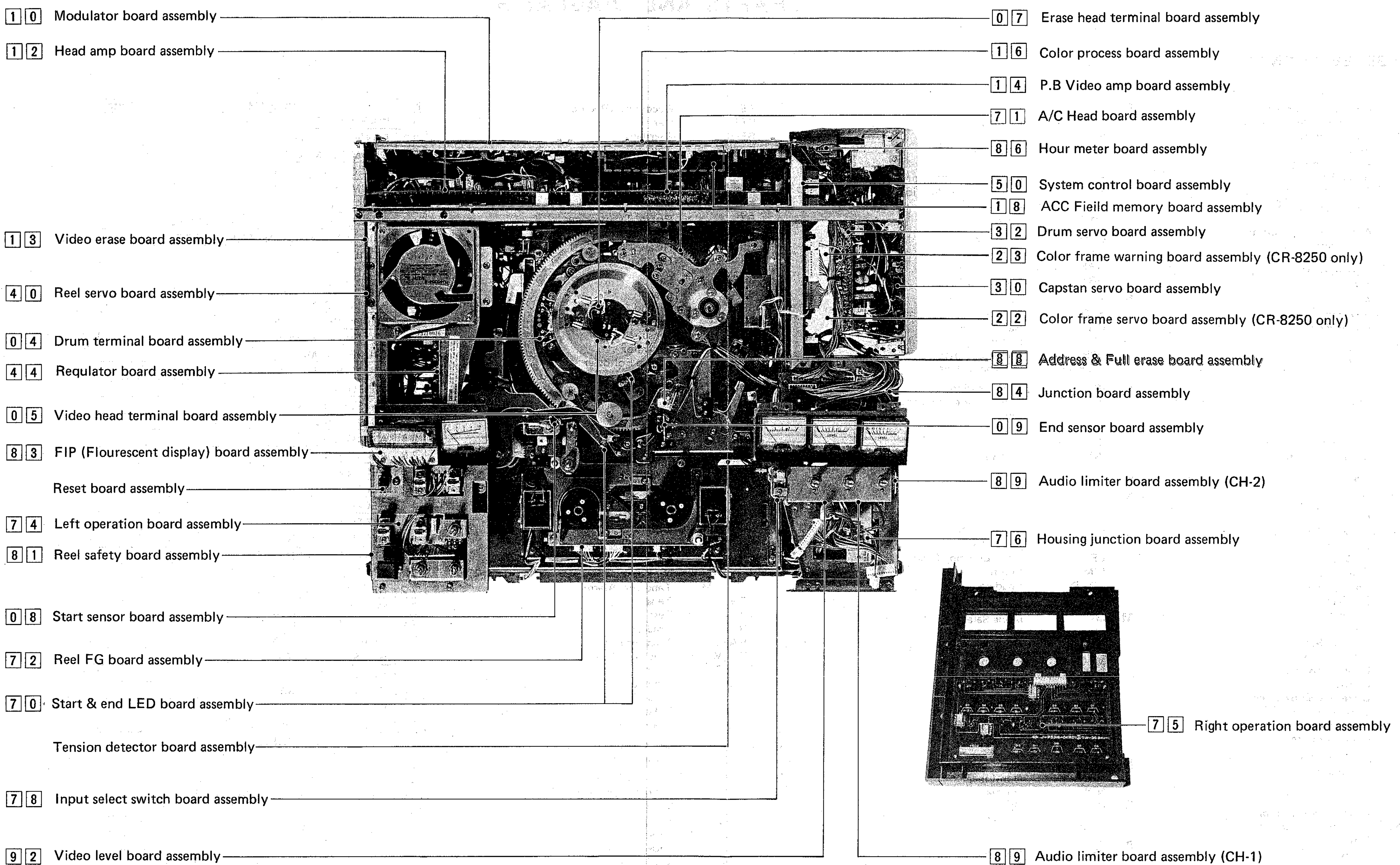
A	AC	Alternating Current
	ACC	Automatic Color Control
	A/CTL	Audio/Control
	ADD	Adder
	A. DUB	Audio Dubbing
	AE	Audio Erase
	AFC	Automatic Frequency Control
	AGC	Automatic Gain Control
	AL	After Loading
	ALC	Automatic Level Control
	AMP	Amplifier
	ANT	Antenna
	APC	Automatic Phase Control
	ASSEM	Assembly
	AUD	Audio
	AUX	Auxiliary
	AH	Audio Head
B	B	Base
	BAL	Balance
	BLK	Black
	BLU	Blue
	BPF	Band-Pass Filter
	BRK	Brake
	BRN	Brown
	B. SOL	Brake Solenoid
	B/W	Black and White
C	CAP	Capstan
	CARR	Carrier
	CASS	Cassette
	CD	Count Down
	CF	Ceramic Filter, Color Frame
	CH	Channel
	COL	Color (Colour)
	CMD	Command
	COMP	Comparator
	CONN	Connector
	CONV	Converter
	COUNT	Counter
	COUNT SEA	Counter Search
	C. PAUSE	Camera Pause
	C. SW	Cassette Switch
	CTL	Control
	C. C	Cassette Compartment
	C. T. C	Cross Talk Cancel
	C. E	Chip Enable
	CNT	Count, Counter
D	DAC	Digital to Analog Converter
	DEMOD	Demodulator
	DET	Detector
	DEV	Deviation
	DFRS	Drum Free Run Stop
	DIF TRANS	Differential Transformer
	DISCRIM	Discriminator
	DL	Delay Line
	DOC	Drop Out Compensator
	D. PU	Drum Pick-up
	DRM FF	Drum Flip-Flop
	DUB	Dubbing
E	EF	Emitter Follower
	EMPH	Emphasis
	EQ	Equalizer
	E. SENS	End Sensor
	E. SW	Electronic Switch
	EP	Extended Play
	EN	Enable
	E	Edit
F	F	Fuse
	F. ADV	Frame Advance
	FE	Full Erase
	FF	Fast Forward Flip-Flop
	FG	Frequency Generator
	FM	Frequency Modulation
	FR	Full Recording
	FWD	Forward
G	GEN	Generator
	GND	Ground
	GRN	Green
	GRY	Gray
H	H	High
	H. D	Horizontal Discriminator
	HG	Hall Generator
	HP	High-Pass Filter
	HPF	High-Pass Filter
	H TRAP	Horizontal Trap
I	ID	Identification
	IF	Intermediate Frequency
	IND	Indicator
	INS	Insert
	INT	Interrupt
	INV	Inverter
J	–	–
K	–	–
L	L	Low
	LE	Loading End
	LP	Long Play
	LED	Light Emitting Diode
	LIM	Limiter
	LOAD	Loading
	LPF	Low-Pass Filter
M	MS	Mode Select
	MOT	Motor
	MDA	Motor Drive Amplifier
	MECHACON	Mechanism Control
	MIC	Microphone
	MIX	Mixer, Mixing
	MMV	Monostable Multivibrator
	MOD	Modulator
	MUTE	Muting
	MON	Monitor
N	NC	Non Connection
	NON-LIN	Non-Linear
	NOR	Normal
O	OP	Operation
	ORN	Orange
	OSC	Oscillator
P	PB	Playback
	PI	Photo Interrupter
	PR	Pinch Roller
	PREV	Preview
	P/S	Pause/Still
	P. TR	Power Transistor
	PU	Pick-up
	PWB	Printed Wiring Board
Q	–	–
R	REC	Recording (Record)
	RED	Red
	REG	Regulator
	REV	Reverse
	REW	Rewind
	RF	Radio Frequency
	R/P	Record/Playback
	RPT	Repeat
	RT	Rotary Transformer
	RUN IND	Running Indicator
	RY	Relay
	R. A.	Random Access
S	SAFE	Safety
	SEAR	Search
	SEC	Second
	SEL	Select
	SENS	Sensor
	SEP	Separator
	SF	Source Follower
	SIG	Signal
	SOL	Solenoid
	S. R	Supply Reel
	S. SENS	Start Sensor
	S. SEP	Sync Separator
	SUP.	Supply
	SWD	Switched
	SW	Switch
	SP	Standard Play
	SYSCON	System Control
	STL	Still
	SUP	Supply
	S. O. S	Sound on Sound
T	TC	Tension Compensate
	T. CODE	Time Code
	T. E ALM	Tape End Alarm
	TEN	Tension
	TP	Test Point
	TR	Tracking
	TRANS	Transformer
	TRC. M	Tracking Meter
	T. REC	Timer Record
	T. SW	Timer Switch
	T/T	Tuner/Timer
	TU	Take-up
	TU. R	Take-up Reel
U	UNLD	Unloading
	UNSWD	Unswitched
V	V	Video, Vertical
	VCO	Voltage Controlled Oscillator
	VLT	Violet
	V. PULSE	Vertical Pulse
	V. SEL	Video Select
	V/T	Video/Television
	VTU	VHF/UHF
	VXO	Variable Crystal Oscillator
W	W	Watt
	W/D	White and Dark
	WHT	White
	WARN	Warning
Y	Y	Luminance
	YLW	Yellow
Z	–	–

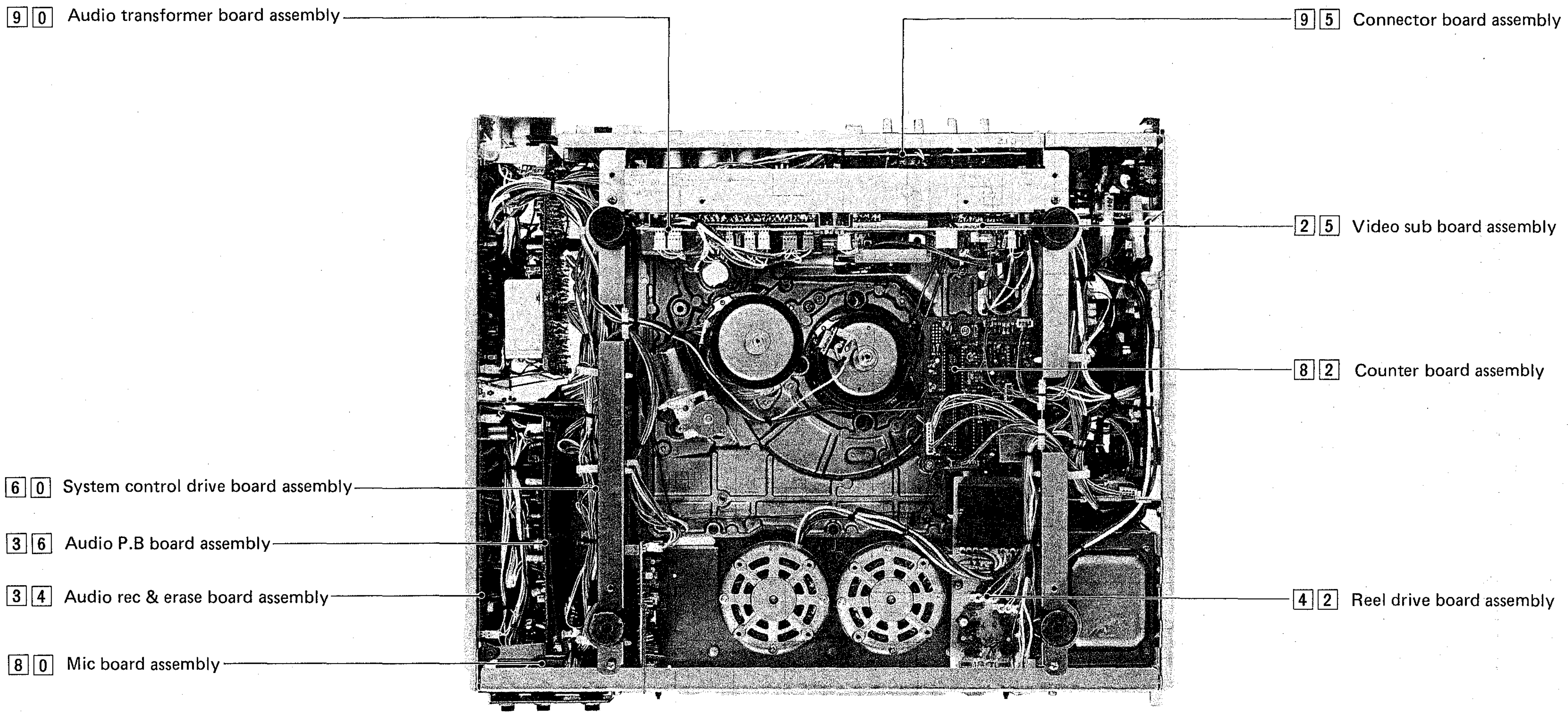
No.	PWB NAME	Note
02	WARNING/SERVO LOCK LED	
03	B/W/H.PHASE LED	
04	DRUM TERMINAL	
05	VIDEO HEAD TERMINAL	
06	DRUM ERASE TERMINAL	□
07	ERASE HEAD TERMINAL	□
08	PHOTO TRANSISTOR (START SENSOR)	
09	PHOTO TRANSISTOR (END SENSOR)	
10	MODULATOR	
12	HEAD AMP	
13	VIDEO ERASE AMP	□
14	P.B. VIDEO AMP	
16	COLOR PROCESS AMP	
18	ACC FIELD MEMORY	
22	COLOR FRAME SERVO	□
23	COLOR FRAME WARNING	□
25	VIDEO SUB	
30	CAPSTAN SERVO	
32	DRUM SERVO	
34	AUDIO REC & ERASE	□ ◉
36	AUDIO P.B. AMP	
40	REEL SERVO	
42	REEL DRIVE	
44	REGULATOR	
50	SYSTEM CTL	
60	SYSTEM CONTROL DRIVE	
70	STRAT/END LED	
71	A/C HEAD	
72	REEL FG	
73	MIC JACK	
74	LEFT OPERATION	
75	RIGHT OPERATION	
76	HOUSING JUNCTION	
77	AUDIO LEVEL SELECT	
78	INPUT SELECT SW	□ ◉
81	REEL SAFETY	
82	COUNTER	
83	FLUORESCENT DISPLAY	
84	JUNCTION	
86	HOUR METER	
88	ADRRESS & FULL ERASE HEAD	
89	AUDIO LIMIT SW	□ ◉
90	AUDIO TRANS	
91	FRAME SW	◉ ☆
92	VIDEO LEVEL	□ ◉
95	CONNECTOR	
	RF. CONVERTER (OPTION)	◉ ☆
97	FRAME SW	□

Note

□ symbol: CR-8250E only ◉symbol: CR-6650E only ☆ symbol: CP-5550E only

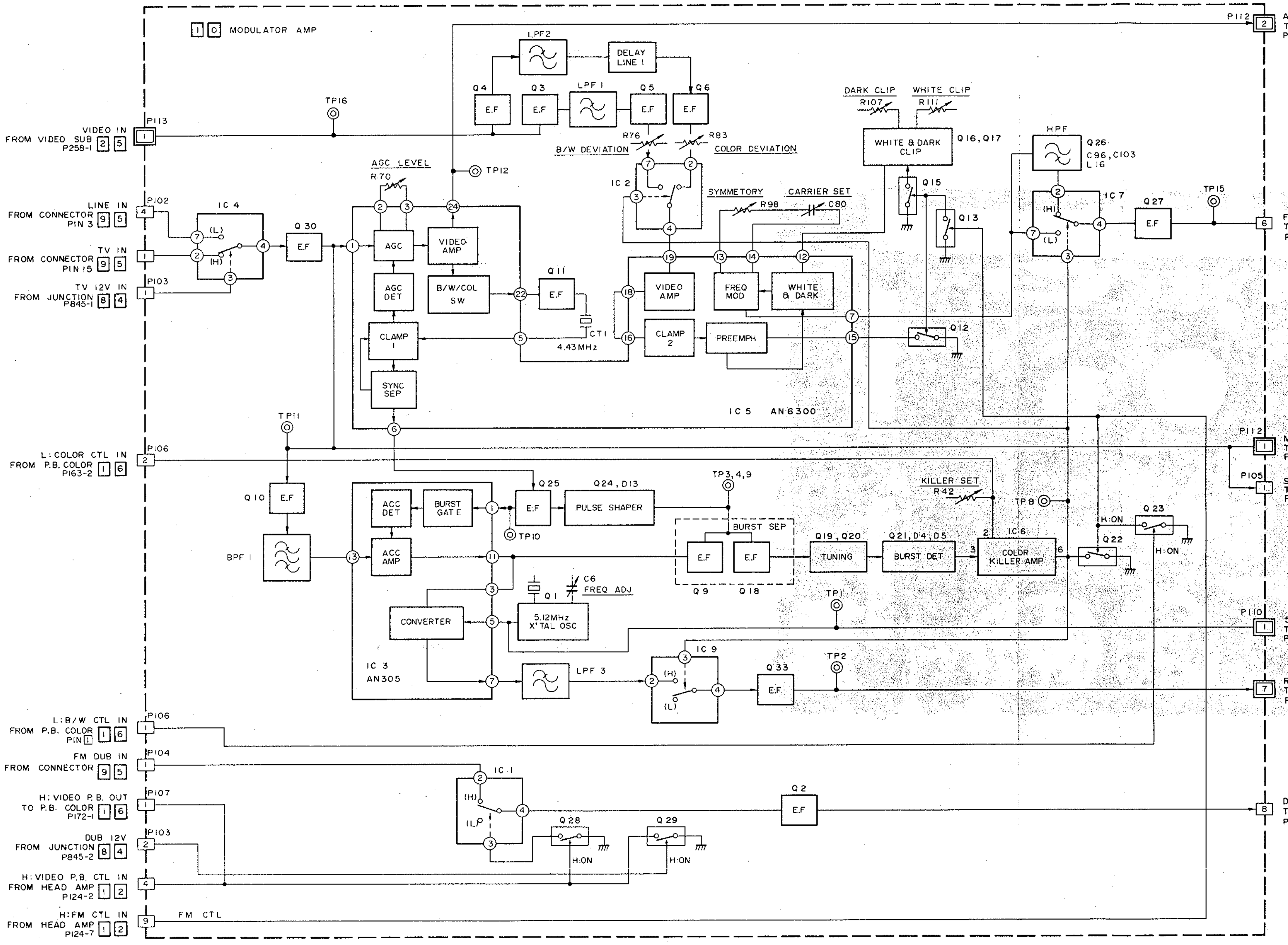
6.2 CIRCUIT BOARD LOCATIONS


10 Modulator board assembly
12 Head amp board assembly
13 Video erase board assembly
40 Reel servo board assembly
04 Drum terminal board assembly
44 Regulator board assembly
05 Video head terminal board assembly
83 FIP (Flourescent display) board assembly
Reset board assembly
74 Left operation board assembly
81 Reel safety board assembly
08 Start sensor board assembly
72 Reel FG board assembly
70 Start & end LED board assembly
Tension detector board assembly
78 Input select switch board assembly
92 Video level board assembly
07 Erase head terminal board assembly
16 Color process board assembly
14 P.B Video amp board assembly
71 A/C Head board assembly
86 Hour meter board assembly
50 System control board assembly
18 ACC Fieild memory board assembly
32 Drum servo board assembly
23 Color frame warning board assembly (CR-8250 only)
30 Capstan servo board assembly
22 Color frame servo board assembly (CR-8250 only)
88 Address & Full erase board assembly
84 Junction board assembly
09 End sensor board assembly
89 Audio limiter board assembly (CH-2)
76 Housing junction board assembly
75 Right operation board assembly
89 Audio limiter board assembly (CH-1)

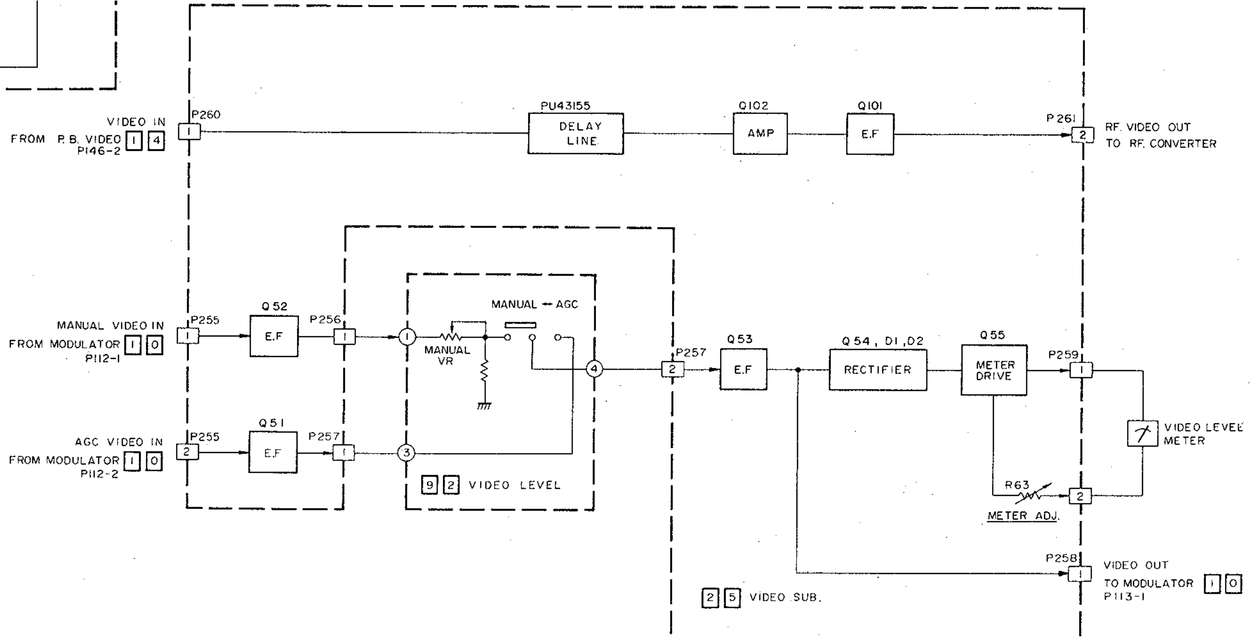

90 Audio transformer board assembly
95 Connector board assembly
25 Video sub board assembly
82 Counter board assembly
60 System control drive board assembly
36 Audio P.B board assembly
34 Audio rec & erase board assembly
42 Reel drive board assembly
80 Mic board assembly

6.3 MODULATOR AND VIDEO SUB BLOCK DIAGRAMS

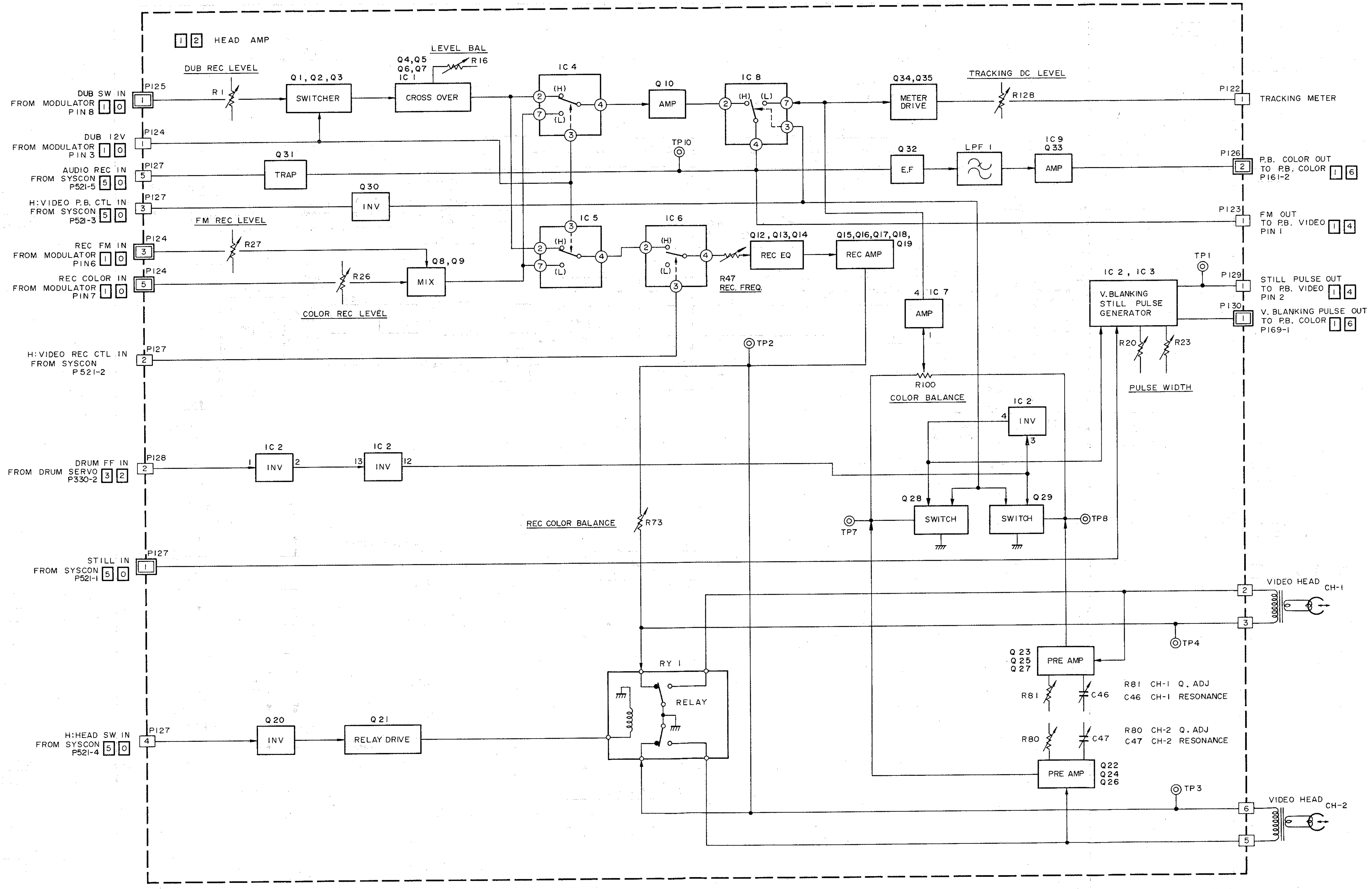
– MODULATOR –


1 0 MODULATOR AMP
VIDEO IN FROM VIDEO SUB 2 5 P258-1
P113
TP16
LINE IN FROM CONNECTOR 9 5 PIN 3
P102
TV IN FROM CONNECTOR 9 5 PIN 15
TV 12V IN FROM JUNCTION 8 4 P845-1
P103
IC 4
(L)
(H)
Q 30
E.F
AGC LEVEL
R70
TP12
AGC
AGC DET
VIDEO AMP
B/W/COL SW
CLAMP 1
SYNC SEP
LPF2
DELAY LINE 1
Q4
Q3
LPF 1
Q5
Q6
R76
R83
B/W DEVIATION
COLOR DEVIATION
IC 2
Q 11
CT1
4.43MHz
SYMMETORY
R98
CARRIER SET
C80
VIDEO AMP
FREQ MOD
WHITE & DARK
CLAMP 2
PREEMPH
IC 5 AN6300
DARK CLIP
R107
WHITE CLIP
R111
WHITE & DARK CLIP
Q16, Q17
Q15
Q13
Q12
HPF
Q26
C96, C103
L16
IC 7
(H)
(L)
Q27
TP15
P112
AGC VIDEO OUT TO VIDEO SUB 2 5 P255-2
FM OUT TO HEAD AMP 1 2 P124-3
TP11
L: COLOR CTL IN FROM P.B. COLOR 1 6 P163-2
P106
Q 10
E.F
BPF 1
ACC DET
BURST GATE
ACC AMP
CONVERTER
Q1
C6
FREQ ADJ
5.12MHz X'TAL OSC
IC 3 AN305
LPF 3
Q25
TP10
Q24, D13
PULSE SHAPER
TP3, 4, 9
BURST SEP
Q 9
Q 18
Q19, Q20
TUNING
Q21, D4, D5
BURST DET
KILLER SET
R42
IC6
COLOR KILLER AMP
TP8
H:ON
Q 23
Q22
TP1
IC 9
(H)
(L)
Q 33
TP2
MANUAL VIDEO OUT TO VIDEO SUB 2 5 P255-1
P105
SYNC VIDEO OUT TO DRUM SERVO 3 2 P323-1
P110
5.12MHz OUT TO P.B. COLOR 1 6 P171-1
REC COLOR OUT TO HEAD AMP 1 2 P124-5
L: B/W CTL IN FROM P.B. COLOR 1 6 PIN 1
P106
FM DUB IN FROM CONNECTOR 9 5
P104
H: VIDEO P.B. OUT TO P.B. COLOR 1 6 P172-1
P107
DUB 12V FROM JUNCTION 8 4 P845-2
P103
H: VIDEO P.B. CTL IN FROM HEAD AMP 1 2 P124-2
H: FM CTL IN FROM HEAD AMP 1 2 P124-7
FM CTL
IC 1
(H)
(L)
Q 28
Q 29
H:ON
Q 2
E.F
DUB SW OUT TO HEAD AMP 1 2 P125-1

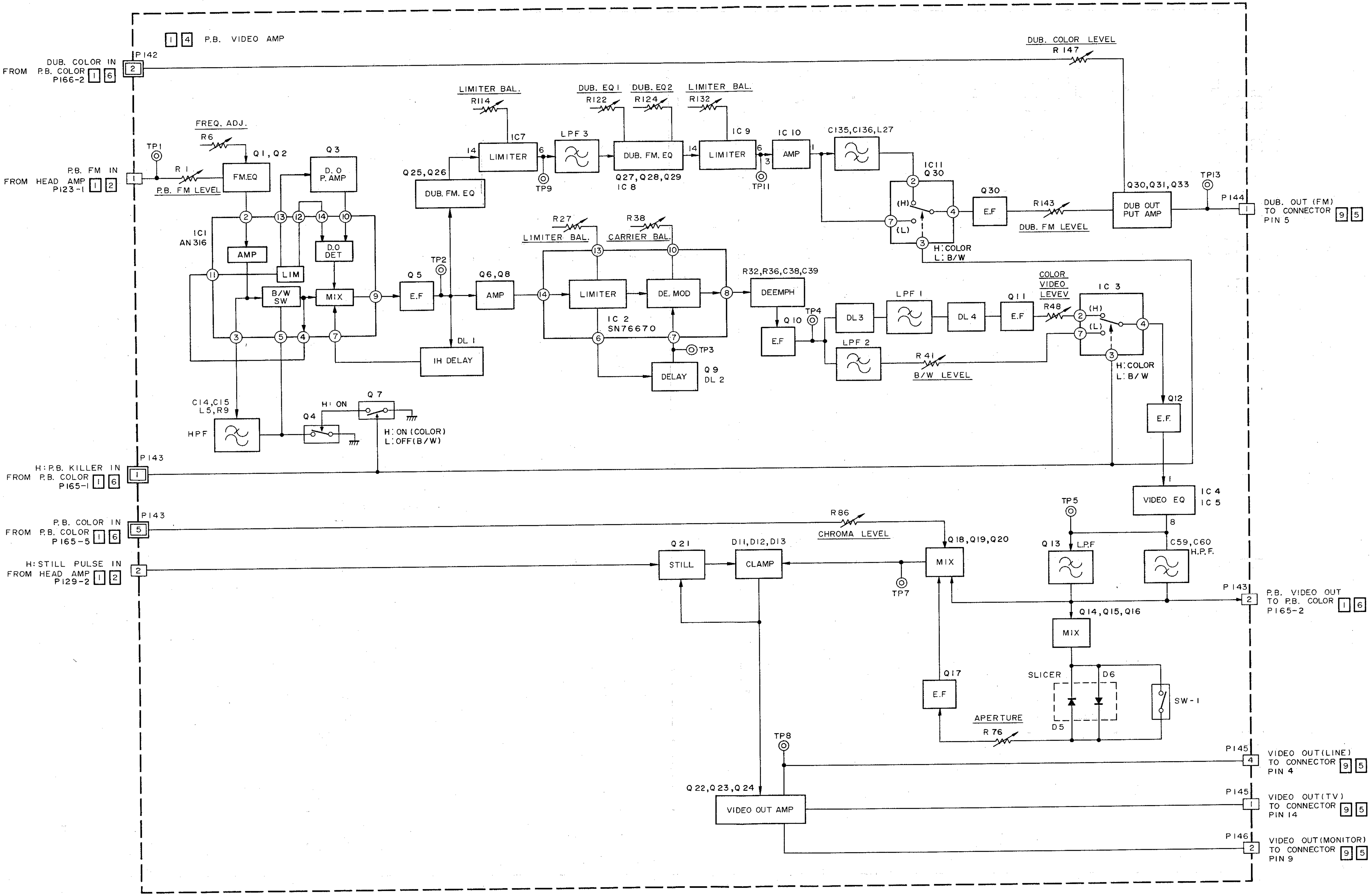
– VIDEO SUB –


VIDEO IN FROM P.B. VIDEO 1 4 P146-2
P260
PU43155
DELAY LINE
Q102
AMP
Q101
E.F
P261
RF. VIDEO OUT TO RF. CONVERTER
MANUAL VIDEO IN FROM MODULATOR 1 0 P112-1
P255
Q 52
E.F
P256
AGC VIDEO IN FROM MODULATOR 1 0 P112-2
Q 51
P257
MANUAL – AGC
MANUAL VR
9 2 VIDEO LEVEL
Q 53
Q 54, D1, D2
RECTIFIER
Q 55
METER DRIVE
P259
VIDEO LEVEL METER
R63
METER ADJ.
P258
VIDEO OUT TO MODULATOR 1 0 P113-1
2 5 VIDEO SUB.

6.4 HEAD AMP BLOCK DIAGRAM

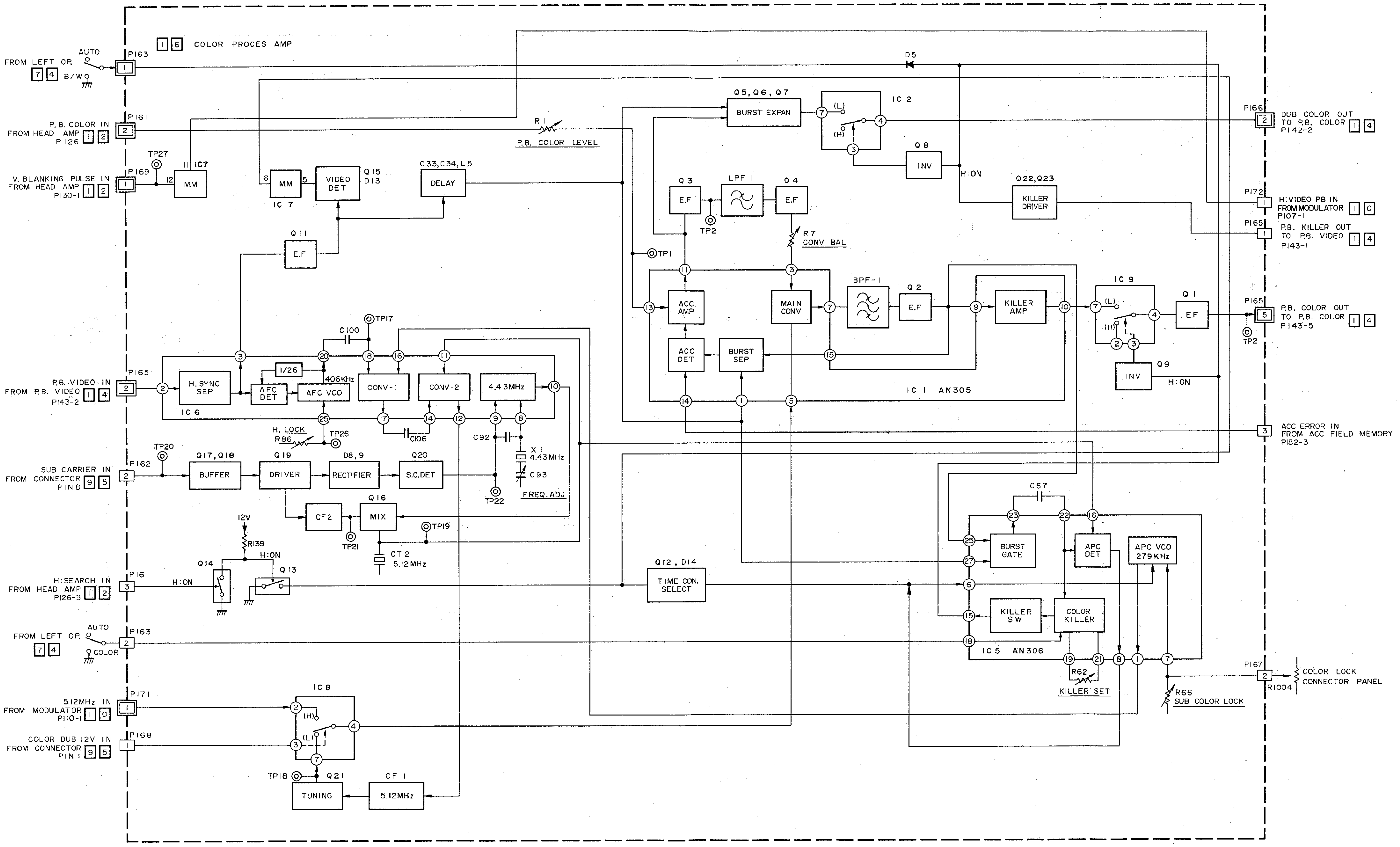

1 2 HEAD AMP
DUB SW IN FROM MODULATOR PIN 8 1 0
P125
DUB REC LEVEL
R1
Q1, Q2, Q3 SWITCHER
Q4, Q5 Q6, Q7 IC 1 CROSS OVER
LEVEL BAL R16
IC 4
Q10 AMP
IC 8
Q34, Q35 METER DRIVE
TRACKING DC LEVEL R128
P122
TRACKING METER
DUB 12V FROM MODULATOR PIN 3 1 0
P124
TP10
AUDIO REC IN FROM SYSCON P521-5 5 0
P127
Q31 TRAP
Q32 E.F
LPF 1
IC 9 Q33 AMP
P126
P.B. COLOR OUT TO P.B. COLOR 1 6 P161-2
H:VIDEO P.B. CTL IN FROM SYSCON P521-3 5 0
Q30 INV
P123
FM OUT TO P.B. VIDEO 1 4 PIN 1
FM REC LEVEL
REC FM IN FROM MODULATOR PIN 6 1 0
R27
IC 5
IC 6
Q12, Q13, Q14 REC EQ
Q15, Q16, Q17, Q18, Q19 REC AMP
REC COLOR IN FROM MODULATOR PIN 7 1 0
R26
Q8, Q9 MIX
COLOR REC LEVEL
R47 REC. FREQ.
IC 7 AMP
TP1
IC 2, IC 3 V. BLANKING STILL PULSE GENERATOR
P129
STILL PULSE OUT TO P.B. VIDEO 1 4 PIN 2
P130
V. BLANKING PULSE OUT TO P.B. COLOR 1 6 P169-1
R20 R23
PULSE WIDTH
H:VIDEO REC CTL IN FROM SYSCON P521-2
TP2
R100 COLOR BALANCE
IC 2 INV
DRUM FF IN FROM DRUM SERVO P330-2 3 2
P128
IC 2 INV
IC 2 INV
Q28 SWITCH
Q29 SWITCH
TP7
TP8
REC COLOR BALANCE R73
STILL IN FROM SYSCON P521-1 5 0
VIDEO HEAD CH-1
TP4
RY 1 RELAY
Q23 Q25 Q27 PRE AMP
R81 CH-1 Q. ADJ
C46 CH-1 RESONANCE
R81 C46
R80 C47
R80 CH-2 Q. ADJ
C47 CH-2 RESONANCE
H:HEAD SW IN FROM SYSCON P521-4 5 0
Q20 INV
Q21 RELAY DRIVE
PRE AMP Q22 Q24 Q26
TP3
VIDEO HEAD CH-2

6.5 PLAYBACK VIDEO AMP BLOCK DIAGRAM

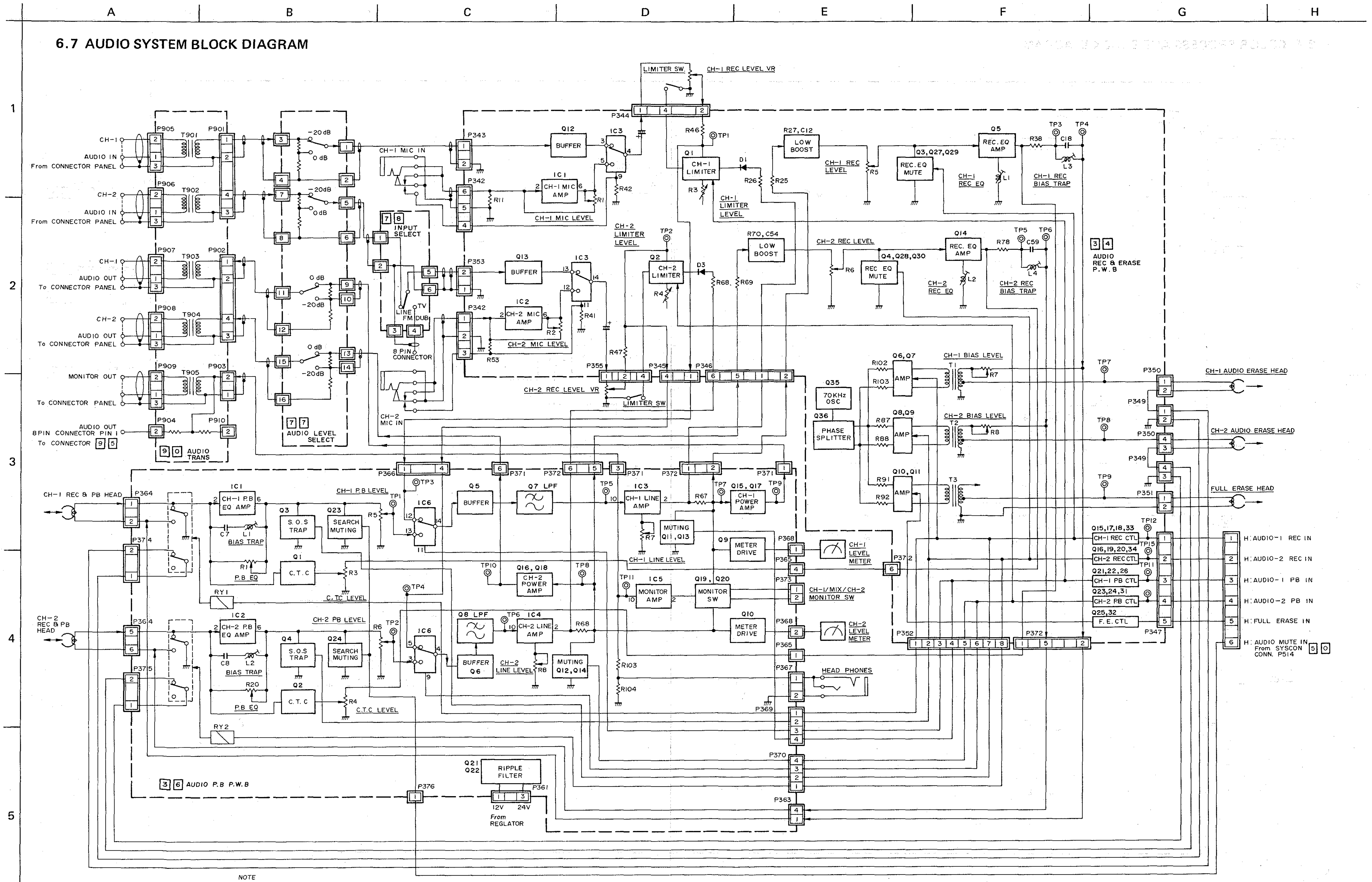


1 4 P.B. VIDEO AMP
DUB. COLOR IN
FROM P.B. COLOR
P166-2 1 6
P142
2
DUB. COLOR LEVEL
R147
P.B. FM IN
FROM HEAD AMP
P123-1 1 2
1
TP1
R1
P.B. FM LEVEL
FREQ. ADJ.
R6
Q1, Q2
FM.EQ
Q3
D.O P.AMP
IC1
AN316
AMP
LIM
B/W SW
D.O DET
MIX
2
13
12
14
10
11
9
3
5
4
7
C14, C15
L5, R9
HPF
Q4
H: ON
Q7
H: ON (COLOR)
L: OFF (B/W)
Q5
E.F
TP2
Q25, Q26
DUB. FM. EQ
DL1
1H DELAY
LIMITER BAL.
R114
IC7
14
LIMITER
6
TP9
LPF 3
DUB. EQ1
R122
DUB. EQ2
R124
DUB. FM. EQ
Q27, Q28, Q29
IC8
LIMITER BAL.
R132
IC9
LIMITER
6
3
TP11
IC10
AMP
1
C135, C136, L27
IC11
Q30
(H)
(L)
H: COLOR
L: B/W
Q30
E.F
R143
DUB. FM LEVEL
Q30, Q31, Q33
DUB OUT PUT AMP
TP13
P144
DUB. OUT (FM)
TO CONNECTOR 9 5
PIN 5
Q6, Q8
AMP
R27
LIMITER BAL.
R38
CARRIER BAL.
LIMITER
DE. MOD
IC2
SN76670
8
TP3
DELAY
Q9
DL2
R32, R36, C38, C39
DEEMPH
Q10
TP4
E.F
DL3
LPF 1
DL4
Q11
E.F
LPF 2
R41
B/W LEVEL
COLOR VIDEO LEVEV
R48
IC3
(H)
(L)
H: COLOR
L: B/W
Q12
E.F.
H: P.B. KILLER IN
FROM P.B. COLOR
P165-1 1 6
P143
VIDEO EQ
IC4
IC5
P.B. COLOR IN
FROM P.B. COLOR
P165-5 1 6
R86
CHROMA LEVEL
H: STILL PULSE IN
FROM HEAD AMP
P129-2 1 2
Q21
STILL
D11, D12, D13
CLAMP
TP7
Q18, Q19, Q20
MIX
TP5
Q13
L.P.F
C59, C60
H.P.F.
P143
P.B. VIDEO OUT
TO P.B. COLOR 1 6
P165-2
Q14, Q15, Q16
MIX
Q17
E.F
SLICER
D6
D5
SW-1
APERTURE
R76
TP8
Q22, Q23, Q24
VIDEO OUT AMP
P145
VIDEO OUT (LINE)
TO CONNECTOR 9 5
PIN 4
P145
VIDEO OUT (TV)
TO CONNECTOR 9 5
PIN 14
P146
VIDEO OUT (MONITOR)
TO CONNECTOR 9 5
PIN 9

6.6 COLOR PROCESS AMP BLOCK DIAGRAM


1 6 COLOR PROCES AMP
FROM LEFT OP. 7 4
AUTO
B/W
P163 1
P.B. COLOR IN FROM HEAD AMP P126 1 2
P161 2
V. BLANKING PULSE IN FROM HEAD AMP P130-1 1 2
P169 1
TP27
IC7
M.M
IC 7
VIDEO DET
Q15 D13
C33,C34,L5
DELAY
Q11
E.F
D5
R1
P.B. COLOR LEVEL
Q5,Q6,Q7
BURST EXPAN
IC 2
(L)
(H)
Q8
INV
H:ON
Q22,Q23
KILLER DRIVER
Q3
E.F
LPF 1
Q4
E.F
TP2
R7
CONV BAL
TP1
ACC AMP
MAIN CONV
BPF-1
Q2
E.F
KILLER AMP
ACC DET
BURST SEP
IC 1 AN305
IC 9
Q1
E.F
Q9
INV
H:ON
P166 2
DUB COLOR OUT TO P.B. COLOR P142-2 1 4
P172 1
H:VIDEO PB IN FROM MODULATOR P107-1 1 0
P165 1
P.B. KILLER OUT TO P.B. VIDEO P143-1 1 4
P165 5
P.B. COLOR OUT TO P.B. COLOR P143-5 1 4
TP2
ACC ERROR IN FROM ACC FIELD MEMORY P182-3
3
P.B. VIDEO IN FROM P.B. VIDEO P143-2 1 4
P165 2
H. SYNC SEP
IC 6
1/26
AFC DET
AFC VCO
406KHz
C100
TP17
CONV-1
CONV-2
4.43MHz
C106
H. LOCK R86
TP26
C92
X1 4.43MHz
C93
FREQ. ADJ
TP22
SUB CARRIER IN FROM CONNECTOR PIN 8 9 5
P162 2
TP20
Q17,Q18
BUFFER
Q19
DRIVER
D8,9
RECTIFIER
Q20
S.C.DET
CF2
Q16
MIX
TP21
TP19
CT2 5.12MHz
12V
R139
H:ON
Q14
Q13
H:SEARCH IN FROM HEAD AMP P126-3 1 2
P161 3
H:ON
Q12, D14
TIME CON. SELECT
C67
BURST GATE
APC DET
APC VCO 279KHz
KILLER SW
COLOR KILLER
IC5 AN306
R62
KILLER SET
R66
SUB COLOR LOCK
P167 2
R1004
COLOR LOCK CONNECTOR PANEL
FROM LEFT OP. 7 4
AUTO
COLOR
P163 2
5.12MHz IN FROM MODULATOR P110-1 1 0
P171 1
COLOR DUB 12V IN FROM CONNECTOR PIN 1 9 5
P168 1
IC8
(H)
(L)
TP18
Q21
TUNING
CF 1
5.12MHz

6.7 AUDIO SYSTEM BLOCK DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
LIMITER SW.
CH-1 REC LEVEL VR
P344
CH-1
AUDIO IN
From CONNECTOR PANEL
CH-2
AUDIO IN
From CONNECTOR PANEL
P905
T901
P901
P906
T902
-20dB
0 dB
P343
CH-1 MIC IN
Q12
BUFFER
IC3
IC1
CH-1 MIC AMP
R11
R1
R42
CH-1 MIC LEVEL
P342
R46
TP1
Q1
CH-1 LIMITER
D1
R26
R25
R3
CH-1 LIMITER LEVEL
R27, C12
LOW BOOST
CH-1 REC LEVEL
R5
Q3, Q27, Q29
REC. EQ MUTE
Q5
REC. EQ AMP
CH-1 REC EQ
L1
R38
C18
TP3
TP4
L3
CH-1 REC BIAS TRAP
CH-1
AUDIO OUT
To CONNECTOR PANEL
CH-2
AUDIO OUT
To CONNECTOR PANEL
P907
T903
P902
P908
T904
7 8 INPUT SELECT
LINE
FM
TV
DUB
8 PIN CONNECTOR
P353
Q13
BUFFER
IC2
CH-2 MIC AMP
R2
R41
CH-2 MIC LEVEL
R53
CH-2 LIMITER LEVEL
TP2
Q2
CH-2 LIMITER
D3
R68
R69
R4
R47
R70, C54
LOW BOOST
CH-2 REC LEVEL
R6
Q4, Q28, Q30
REC EQ MUTE
CH-2 REC EQ
L2
Q14
REC. EQ AMP
R78
TP5
TP6
C59
L4
CH-2 REC BIAS TRAP
3 4 AUDIO REC & ERASE P.W.B
MONITOR OUT
To CONNECTOR PANEL
P909
T905
P903
AUDIO OUT
8PIN CONNECTOR PIN 1
To CONNECTOR 9 5
P904
P910
9 0 AUDIO TRANS
7 7 AUDIO LEVEL SELECT
CH-2 MIC IN
P355
P345
P346
CH-2 REC LEVEL VR
LIMITER SW
R102
R103
Q6, Q7
AMP
CH-1 BIAS LEVEL
T1
R7
Q35
70KHz OSC
Q36
PHASE SPLITTER
R87
R88
Q8, Q9
AMP
CH-2 BIAS LEVEL
T2
R8
R91
R92
Q10, Q11
AMP
T3
TP7
TP8
TP9
P350
P349
P351
CH-1 AUDIO ERASE HEAD
CH-2 AUDIO ERASE HEAD
FULL ERASE HEAD
CH-1 REC & PB HEAD
P364
P374
IC1
CH-1 P.B EQ AMP
C7
L1
BIAS TRAP
R1
P.B EQ
Q3
S.O.S TRAP
Q23
SEARCH MUTING
Q1
C.T.C
R3
C.T.C LEVEL
RY1
P366
TP3
CH-1 P.B LEVEL
TP1
R5
IC6
Q5
BUFFER
Q7 LPF
TP5
IC3
CH-1 LINE AMP
R67
TP7
Q15, Q17
CH-1 POWER AMP
TP9
P371
P372
MUTING Q11, Q13
R7
CH-1 LINE LEVEL
Q9
METER DRIVE
P368
P365
CH-1 LEVEL METER
P372
TP10
Q16, Q18
CH-2 POWER AMP
TP8
TP11
IC5
MONITOR AMP
Q19, Q20
MONITOR SW
P373
CH-1/MIX/CH-2 MONITOR SW
TP4
CH-2 REC & PB HEAD
P364
P375
IC2
CH-2 P.B EQ AMP
C8
L2
BIAS TRAP
R20
P.B EQ
Q4
S.O.S TRAP
Q24
SEARCH MUTING
Q2
C.T.C
R4
C.T.C LEVEL
RY2
CH-2 PB LEVEL
R6
TP2
Q8 LPF
TP6
IC4
CH-2 LINE AMP
R68
BUFFER Q6
CH-2 LINE LEVEL
R8
MUTING Q12, Q14
R103
R104
Q10
METER DRIVE
CH-2 LEVEL METER
P367
HEAD PHONES
P369
P370
P363
TP12
TP15
TP11
Q15, 17, 18, 33
CH-1 REC CTL
Q16, 19, 20, 34
CH-2 REC CTL
Q21, 22, 26
CH-1 PB CTL
Q23, 24, 31
CH-2 PB CTL
Q25, 32
F.E. CTL
P347
P352
P372
H: AUDIO-1 REC IN
H: AUDIO-2 REC IN
H: AUDIO-1 PB IN
H: AUDIO-2 PB IN
H: FULL ERASE IN
H: AUDIO MUTE IN
From SYSCON CONN. P514
5 0
3 6 AUDIO P.B P.W.B
P376
Q21
Q22
RIPPLE FILTER
P361
12V
24V
From REGLATOR

NOTE

S.O.S : SOUND ON SOUND

RY : RELAY

C.T.L : CONTROL

C.T.C : CROSS TALK CANCEL

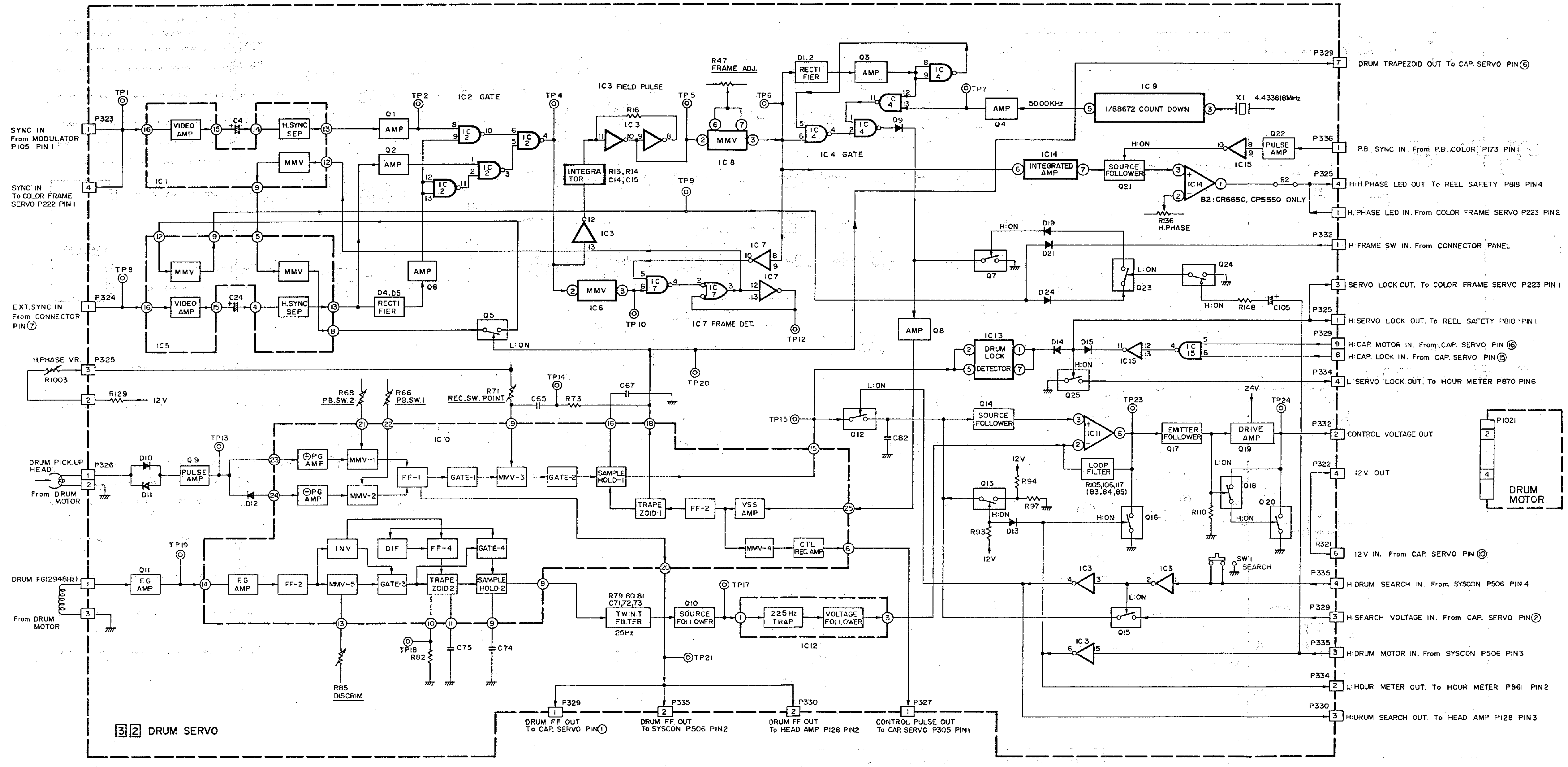
SYSCON : SYSTEM CONTROL

EQ : EQUALIZE

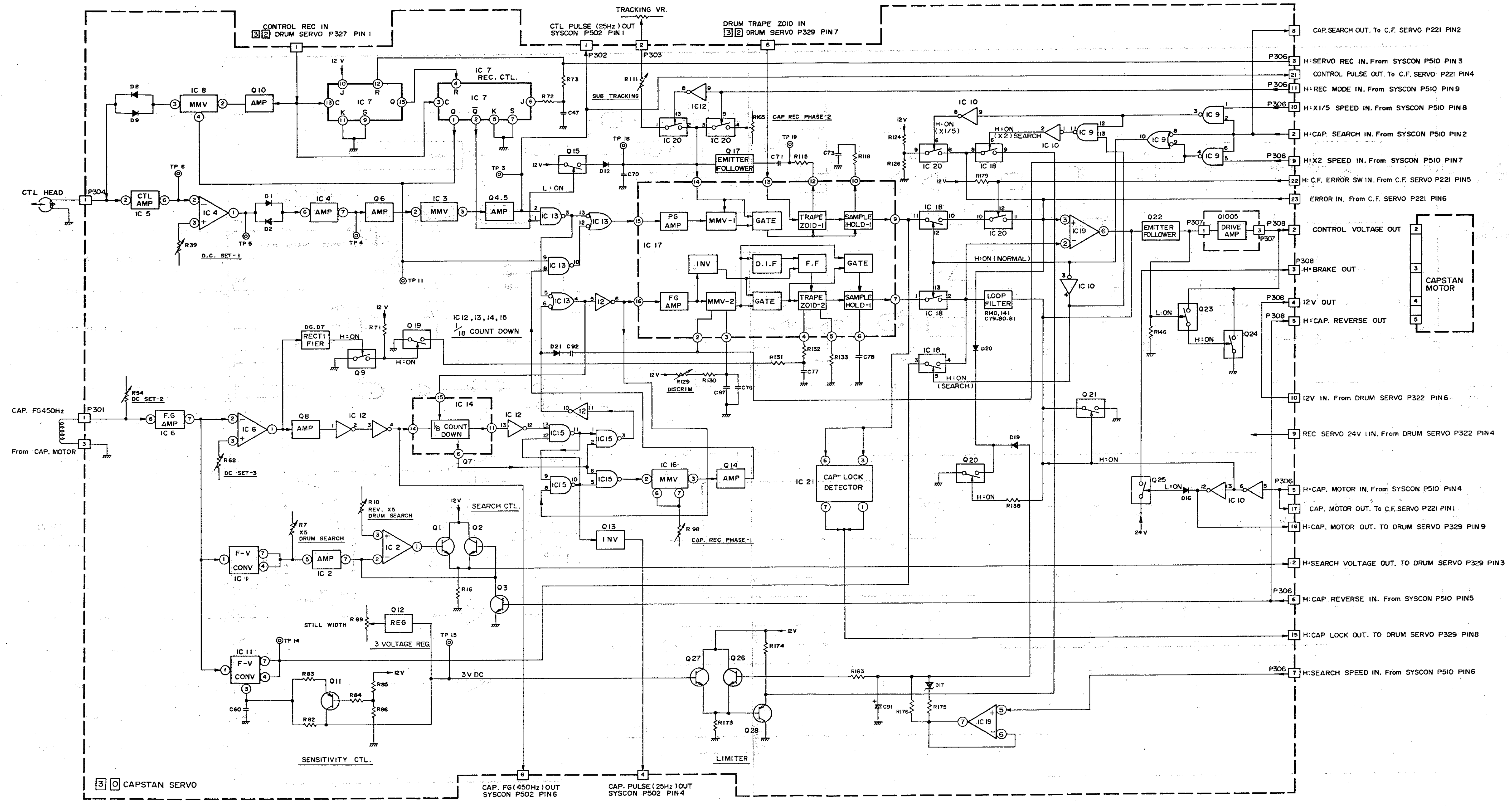
R & P : REC AND PLAYBACK

F.E : FULL ERASE

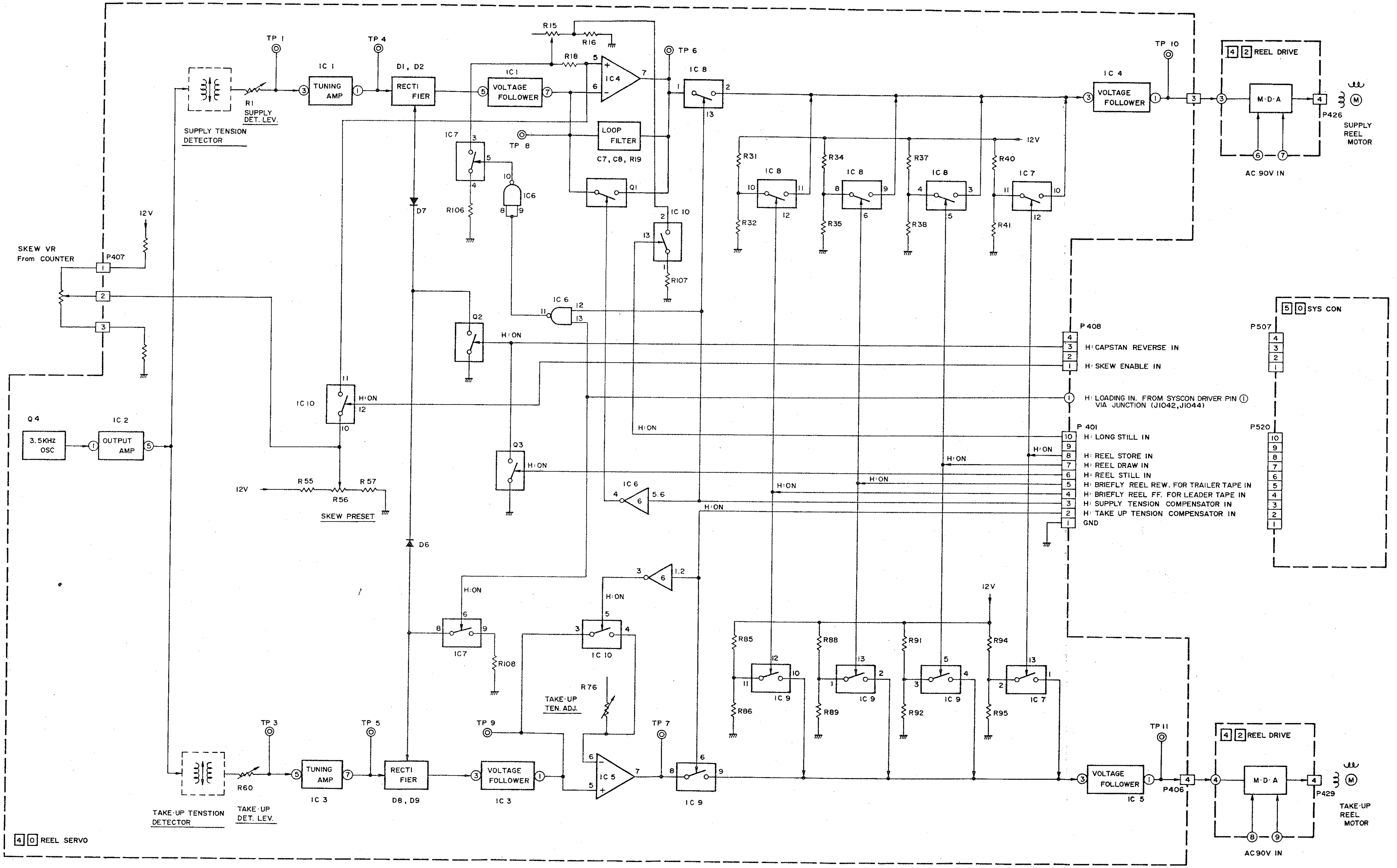
6.8 DRUM SERVO BLOCK DIAGRAM

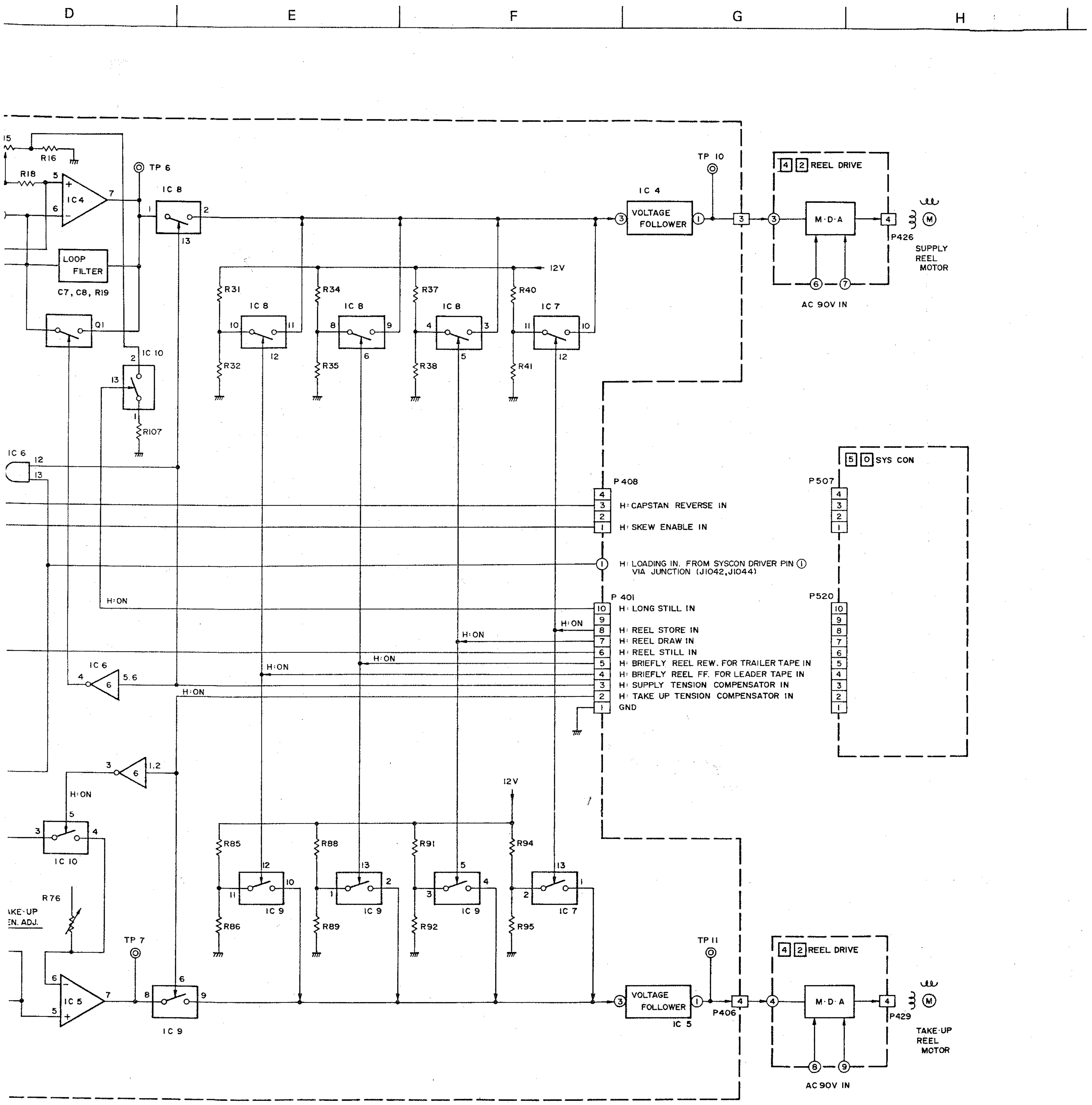

SYNC IN
From MODULATOR P105 PIN 1
SYNC IN
To COLOR FRAME SERVO P222 PIN 1
EXT.SYNC IN
From CONNECTOR PIN ⑦
H.PHASE VR.
R1003
R129
12V
DRUM PICK-UP HEAD
From DRUM MOTOR
DRUM FG(2948Hz)
From DRUM MOTOR
P323
P324
P325
P326
TP1
TP2
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP12
TP13
TP14
TP15
TP17
TP18
TP19
TP20
TP21
TP23
TP24
VIDEO AMP
C4
H.SYNC SEP
MMV
IC1
IC5
C24
Q1
AMP
Q2
IC2 GATE
IC2
IC3 FIELD PULSE
R16
IC3
INTEGRATOR
R13, R14
C14, C15
R47
FRAME ADJ.
MMV
IC8
D1.2
RECTIFIER
Q3
IC4
D9
IC4 GATE
AMP
Q4
50.00KHz
IC9
1/88672 COUNT DOWN
X1 4.433618MHz
Q22
PULSE AMP
IC15
H:ON
IC14
INTEGRATED AMP
SOURCE FOLLOWER
Q21
B2
B2:CR6650, CP5550 ONLY
R136
H.PHASE
D19
D21
Q7
L:ON
Q23
Q24
D24
H:ON
R148
C105
AMP
Q6
D4.D5
RECTIFIER
Q5
L:ON
IC6
IC7
IC7 FRAME DET.
AMP
Q8
IC13
DRUM LOCK DETECTOR
D14
D15
Q25
R68
PB.SW.2
R66
PB.SW.1
R71
REC.SW. POINT
C65
R73
C67
IC10
Q9
PULSE AMP
D10
D11
D12
⊕PG AMP
⊖PG AMP
MMV-1
MMV-2
FF-1
GATE-1
MMV-3
GATE-2
SAMPLE HOLD-1
TRAPEZOID-1
FF-2
VSS AMP
MMV-4
CTL REC.AMP
Q11
FG AMP
INV
DIF
FF-4
GATE-4
FF-2
MMV-5
GATE-3
TRAPEZOID2
SAMPLE HOLD-2
R82
C75
C74
R85
DISCRIM
R79,80,81
C71,72,73
TWIN.T FILTER
25Hz
Q10
SOURCE FOLLOWER
225Hz TRAP
VOLTAGE FOLLOWER
IC12
Q12
C82
Q14
SOURCE FOLLOWER
IC11
LOOP FILTER
R105,106,117
(83,84,85)
EMITTER FOLLOWER
Q17
24V
DRIVE AMP
Q19
Q13
12V
R94
R97
R93
D13
Q16
R110
Q18
Q20
SW1
SEARCH
Q15
P329
DRUM TRAPEZOID OUT. To CAP. SERVO PIN⑥
P336
P.B. SYNC IN. From P.B. COLOR P173 PIN1
H:H.PHASE LED OUT. To REEL SAFETY P818 PIN4
H.PHASE LED IN. From COLOR FRAME SERVO P223 PIN2
P332
H:FRAME SW IN. From CONNECTOR PANEL
SERVO LOCK OUT. To COLOR FRAME SERVO P223 PIN1
H:SERVO LOCK OUT. To REEL SAFETY P818 PIN1
H:CAP. MOTOR IN. From CAP. SERVO PIN⑯
H:CAP. LOCK IN. From CAP. SERVO PIN⑮
P334
L:SERVO LOCK OUT. To HOUR METER P870 PIN6
CONTROL VOLTAGE OUT
P322
12V OUT
R321
12V IN. From CAP. SERVO PIN⑩
P335
H:DRUM SEARCH IN. From SYSCON P506 PIN4
H:SEARCH VOLTAGE IN. From CAP. SERVO PIN②
H:DRUM MOTOR IN. From SYSCON P506 PIN3
L:HOUR METER OUT. To HOUR METER P861 PIN2
P330
H:DRUM SEARCH OUT. To HEAD AMP P128 PIN3
P1021
DRUM MOTOR
DRUM FF OUT
To CAP. SERVO PIN①
DRUM FF OUT
To SYSCON P506 PIN2
DRUM FF OUT
To HEAD AMP P128 PIN2
P327
CONTROL PULSE OUT
To CAP. SERVO P305 PIN1
32 DRUM SERVO

6.9 CAPSTAN SERVO BLOCK DIAGRAM


CONTROL REC IN
3 2 DRUM SERVO P327 PIN 1
CTL PULSE (25Hz) OUT
SYSCON P502 PIN 1
TRACKING VR.
DRUM TRAPE ZOID IN
3 2 DRUM SERVO P329 PIN 7
P302
P303
CTL HEAD
P304
CTL AMP
IC 5
IC 8
MMV
Q10
AMP
IC 7
REC. CTL.
IC 4
AMP
Q6
IC 3
MMV
Q4.5
D.C. SET-1
TP 6
TP 5
TP 4
TP 11
R39
Q15
L: ON
D12
C70
TP 18
TP 19
TP 3
SUB TRACKING
R111
IC12
IC 20
Q17
EMITTER FOLLOWER
C71
R115
C73
R118
R165
CAP REC PHASE-2
IC 17
PG AMP
MMV-1
GATE
TRAPE ZOID-1
SAMPLE HOLD-1
INV
D.I.F
F.F
GATE
FG AMP
MMV-2
TRAPE ZOID-2
SAMPLE HOLD-1
IC 13
IC 10
H:ON (X1/5)
H:ON (X2) SEARCH
IC 9
IC 18
H:ON (NORMAL)
LOOP FILTER
R140, 141
C79, 80, 81
IC19
Q22
EMITTER FOLLOWER
Q1005
DRIVE AMP
P307
P308
CAPSTAN MOTOR
L:ON
Q23
H:ON
Q24
R146
D20
H:ON (SEARCH)
D6, D7
RECTIFIER
R71
Q19
H:ON
Q9
IC12, 13, 14, 15
1/18 COUNT DOWN
D21
C92
R131
R132
C77
R133
C78
12V
R129
R130
DISCRIM
C97
C76
CAP. FG450Hz
From CAP. MOTOR
P301
R54
DC SET-2
F.G AMP
IC 6
R62
DC SET-3
Q8
AMP
IC 12
IC 14
1/8 COUNT DOWN
Q7
IC15
IC 16
MMV
Q14
AMP
R 98
CAP. REC PHASE-1
Q13
INV
IC 21
CAP-LOCK DETECTOR
Q21
Q20
R138
D19
H:ON
Q25
L:ON
D16
24V
R10
REV. X5
DRUM SEARCH
R7
X5
DRUM SEARCH
SEARCH CTL.
F-V CONV
IC 1
AMP
IC 2
Q1
Q2
R16
Q3
Q12
REG
STILL WIDTH
R89
3 VOLTAGE REG
TP 15
TP 14
IC 11
F-V CONV
R83
Q11
R84
R85
R86
R82
C60
3V DC
SENSITIVITY CTL.
Q27
Q26
R174
R173
Q28
LIMITER
R163
C91
R176
D17
R175
3 0 CAPSTAN SERVO
CAP. FG (450Hz) OUT
SYSCON P502 PIN6
CAP. PULSE (25Hz) OUT
SYSCON P502 PIN4
8 CAP. SEARCH OUT. To C.F. SERVO P221 PIN2
P306
3 H:SERVO REC IN. From SYSCON P510 PIN3
21 CONTROL PULSE OUT. To C.F. SERVO P221 PIN4
11 H:REC MODE IN. From SYSCON P510 PIN9
10 H:X1/5 SPEED IN. From SYSCON P510 PIN8
2 H:CAP. SEARCH IN. From SYSCON P510 PIN2
9 H:X2 SPEED IN. From SYSCON P510 PIN7
22 H: C.F. ERROR SW IN. From C.F. SERVO P221 PIN5
23 ERROR IN. From C.F. SERVO P221 PIN6
2 CONTROL VOLTAGE OUT
3 H:BRAKE OUT
4 12V OUT
5 H:CAP. REVERSE OUT
10 12V IN. From DRUM SERVO P322 PIN6
9 REC SERVO 24V IN. From DRUM SERVO P322 PIN4
5 H:CAP. MOTOR IN. From SYSCON P510 PIN4
17 CAP. MOTOR OUT. To C.F. SERVO P221 PIN1
16 H:CAP. MOTOR OUT. TO DRUM SERVO P329 PIN9
2 H:SEARCH VOLTAGE OUT. TO DRUM SERVO P329 PIN3
6 H:CAP REVERSE IN. From SYSCON P510 PIN5
15 H:CAP LOCK OUT. TO DRUM SERVO P329 PIN8
7 H:SEARCH SPEED IN. From SYSCON P510 PIN6

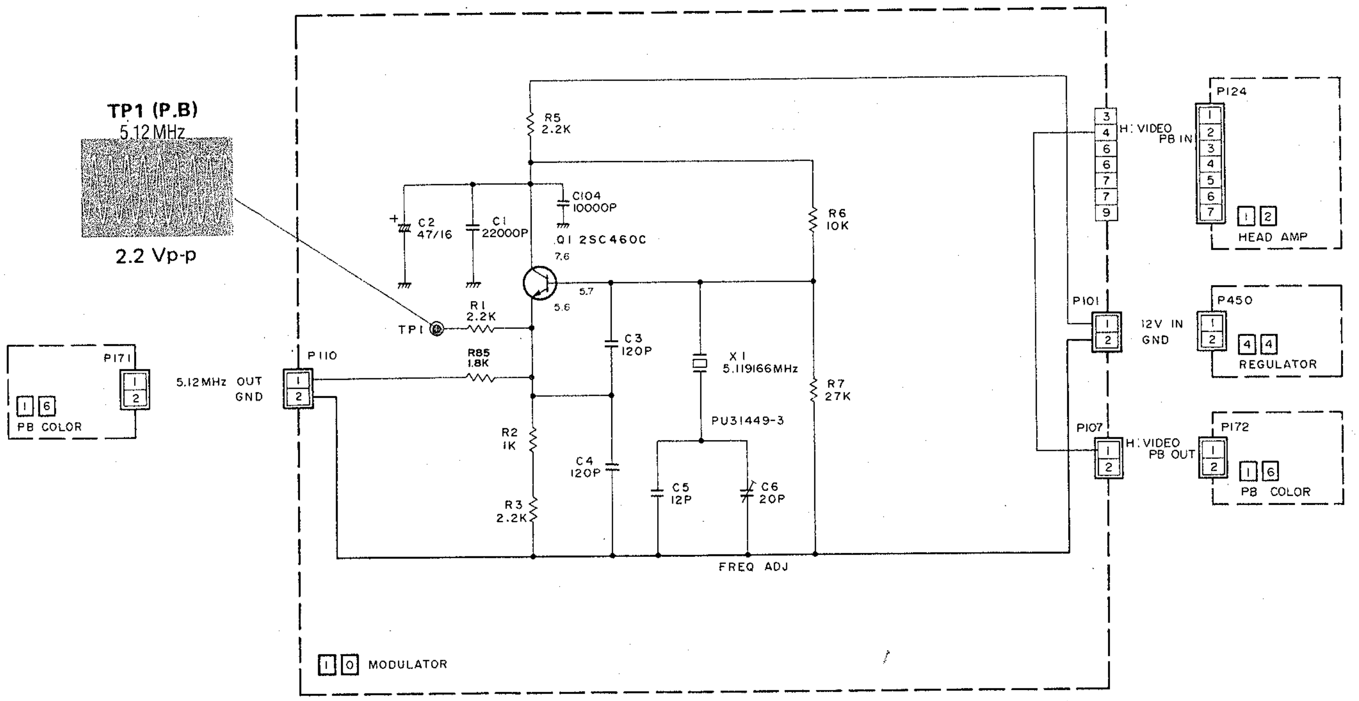
6.10 REEL SERVO BLOCK DIAGRAM


TP 1
TP 4
IC 1
TUNING AMP
D1, D2
RECTI FIER
IC1
VOLTAGE FOLLOWER
R15
R16
R18
IC4
TP 6
IC 8
R1
SUPPLY DET. LEV.
SUPPLY TENSION DETECTOR
LOOP FILTER
C7, C8, R19
TP 8
IC7
IC6
R106
D7
Q1
IC 10
R107
12V
R31
R32
R34
R35
R37
R38
R40
R41
TP 10
IC 4
VOLTAGE FOLLOWER
4 2 REEL DRIVE
M·D·A
P426
SUPPLY REEL MOTOR
AC 90V IN
SKEW VR
From COUNTER
P407
Q2
H:ON
IC 6
5 0 SYS CON
P408
P507
H: CAPSTAN REVERSE IN
H: SKEW ENABLE IN
H: LOADING IN. FROM SYSCON DRIVER PIN ① VIA JUNCTION (J1042, J1044)
P 401
P520
H: LONG STILL IN
H: REEL STORE IN
H: REEL DRAW IN
H: REEL STILL IN
H: BRIEFLY REEL REW. FOR TRAILER TAPE IN
H: BRIEFLY REEL FF. FOR LEADER TAPE IN
H: SUPPLY TENSION COMPENSATOR IN
H: TAKE UP TENSION COMPENSATOR IN
GND
Q4
3.5KHz OSC
IC 2
OUTPUT AMP
IC10
Q3
R55
R56
R57
SKEW PRESET
D6
IC7
R108
IC 10
R76
TAKE-UP TEN. ADJ.
R85
R86
R88
R89
R91
R92
R94
R95
IC 9
IC 7
TP 3
TP 5
TP 9
TP 7
TP 11
TUNING AMP
IC 3
R60
TAKE-UP DET. LEV.
TAKE-UP TENSTION DETECTOR
RECTI FIER
D8, D9
VOLTAGE FOLLOWER
IC 5
IC 9
P406
4 2 REEL DRIVE
M·D·A
P429
TAKE-UP REEL MOTOR
AC90V IN
4 0 REEL SERVO


D
E
F
G
H
R16
R18
IC4
TP 6
IC 8
13
LOOP FILTER
C7, C8, R19
Q1
IC 10
R107
IC 6
TP 10
IC 4
VOLTAGE FOLLOWER
12V
R31
R32
R34
R35
R37
R38
R40
R41
IC 7
4 2 REEL DRIVE
M·D·A
P426
SUPPLY REEL MOTOR
AC 90V IN
5 0 SYS CON
P507
P 408
H: CAPSTAN REVERSE IN
H: SKEW ENABLE IN
H: LOADING IN. FROM SYSCON DRIVER PIN ① VIA JUNCTION (J1042,J1044)
P 401
P520
H: LONG STILL IN
H: REEL STORE IN
H: REEL DRAW IN
H: REEL STILL IN
H: BRIEFLY REEL REW. FOR TRAILER TAPE IN
H: BRIEFLY REEL FF. FOR LEADER TAPE IN
H: SUPPLY TENSION COMPENSATOR IN
H: TAKE UP TENSION COMPENSATOR IN
GND
H:ON
R76
TAKE-UP TEN. ADJ.
R85
R86
R88
R89
R91
R92
R94
R95
IC 9
TP 7
IC 5
TP 11
P406
P429
TAKE-UP REEL MOTOR

6.11 MODULATOR CIRCUIT SCHEMATIC DIAGRAM

– PLAYER –

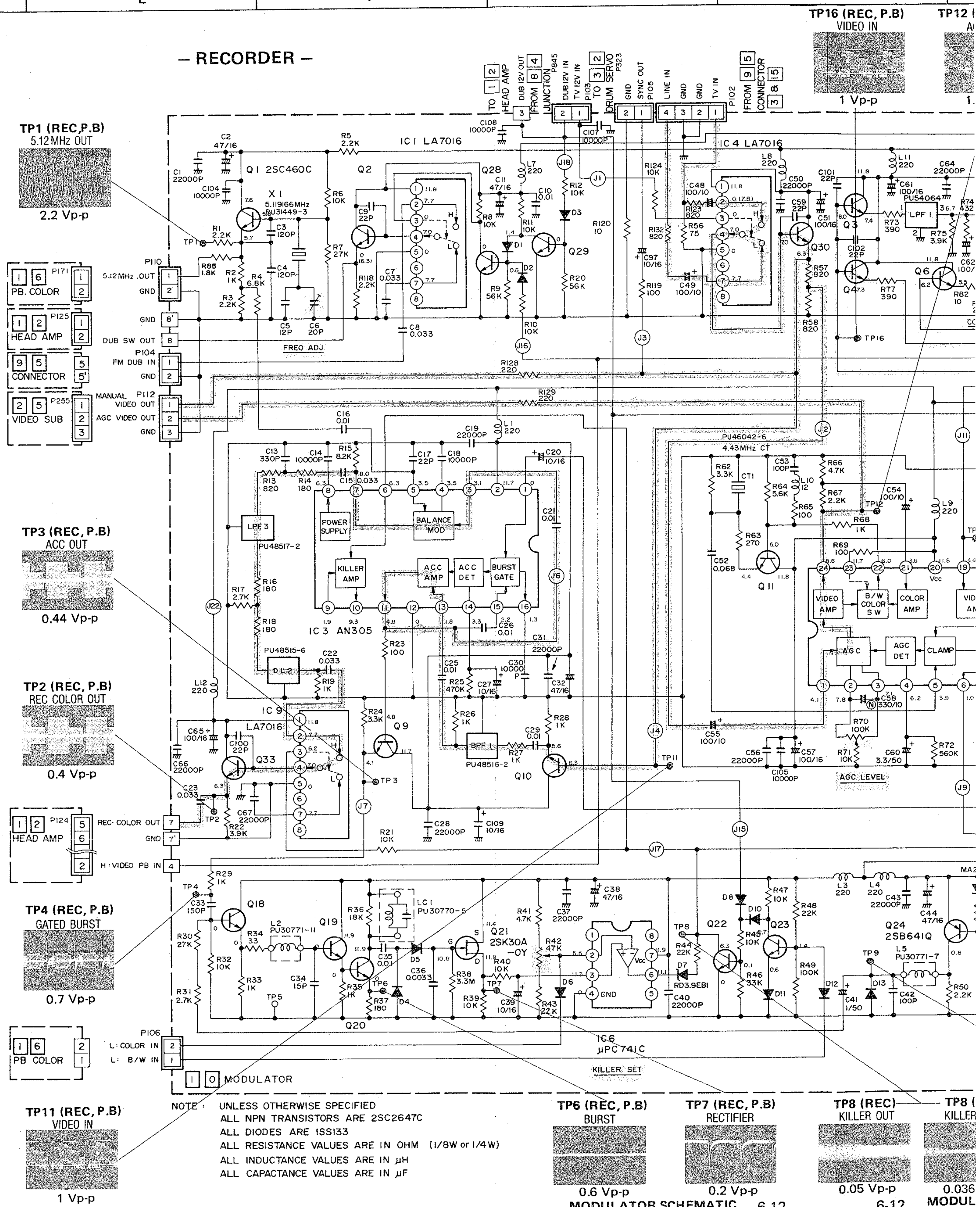


TP1 (P.B)
5.12MHz
2.2 Vp-p
P171
1 6 PB COLOR
5.12MHz OUT
GND
P110
TP1
R1 2.2K
R85 1.8K
R2 1K
R3 2.2K
C2 47/16
C1 22000P
C104 10000P
Q1 2SC460C
R5 2.2K
R6 10K
R7 27K
C3 120P
C4 120P
X1 5.119166MHz
PU31449-3
C5 12P
C6 20P
FREQ ADJ
P101
12V IN
GND
P450
4 4 REGULATOR
P107
H: VIDEO PB OUT
P172
1 6 PB COLOR
H: VIDEO PB IN
P124
1 2 HEAD AMP
1 0 MODULATOR

NOTE: UNLESS OTHERWISE SPECIFIED;
ALL RESISTORS ARE IN OHM (1/8W)
ALL CAPACITORS ARE IN μF

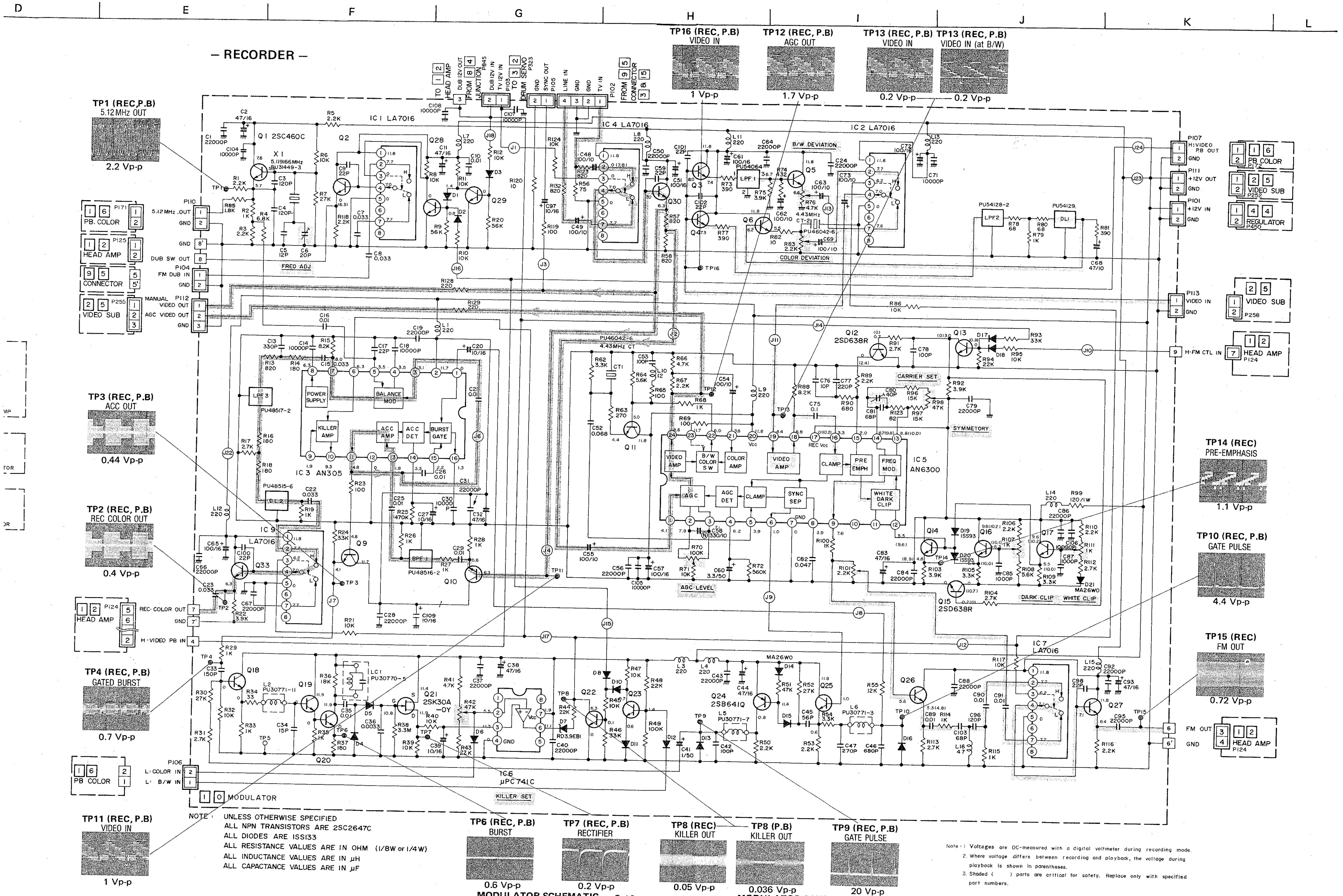
Note: Voltage are DC-measured with a digital voltmeter during playback mode.

– RECORDER –



TP16 (REC, P.B)
VIDEO IN
1 Vp-p
TP1 (REC,P.B)
5.12MHz OUT
2.2 Vp-p
TP3 (REC, P.B)
ACC OUT
0.44 Vp-p
TP2 (REC, P.B)
REC COLOR OUT
0.4 Vp-p
TP4 (REC, P.B)
GATED BURST
0.7 Vp-p
TP11 (REC, P.B)
VIDEO IN
1 Vp-p
TP6 (REC, P.B)
BURST
0.6 Vp-p
TP7 (REC, P.B)
RECTIFIER
0.2 Vp-p
TP8 (REC)
KILLER OUT
0.05 Vp-p
IC1 LA7016
IC3 AN305
IC4 LA7016
IC6 μPC741C
IC9 LA7016
Q1 2SC460C
X1 5.119166MHz PU31449-3
Q21 2SK30A -OY
Q24 2SB641Q
LC1 PU30770-5
L2 PU30771-11
L5 PU30771-7
PU48517-2
PU48515-6
PU48516-2
PU46042-6
4.43MHz CT
POWER SUPPLY
BALANCE MOD
KILLER AMP
ACC AMP
ACC DET
BURST GATE
LPF 3
DL 2
BPF 1
LPF 1
VIDEO AMP
B/W COLOR SW
COLOR AMP
AGC
AGC DET
CLAMP
FREQ ADJ
AGC LEVEL
KILLER SET
P171 1 6 PB. COLOR
P125 1 2 HEAD AMP
9 5 CONNECTOR
P255 2 5 VIDEO SUB
P124 1 2 HEAD AMP
P106 1 6 PB COLOR
5.12MHz OUT
GND
DUB SW OUT
P104 FM DUB IN
P112 MANUAL VIDEO OUT
AGC VIDEO OUT
REC COLOR OUT
H: VIDEO PB IN
L: COLOR IN
L: B/W IN
TO 1 2 HEAD AMP
FROM 8 4 JUNCTION
TO 3 2 DRUM SERVO
FROM 9 5 CONNECTOR 3 & 15
1 0 MODULATOR

NOTE: UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/8W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACTANCE VALUES ARE IN μF



D
E
F
G
H
I
J
K
L
- RECORDER -
TP1 (REC,P.B)
5.12MHz OUT
2.2 Vp-p
TP16 (REC,P.B)
VIDEO IN
1 Vp-p
TP12 (REC,P.B)
AGC OUT
1.7 Vp-p
TP13 (REC,P.B)
VIDEO IN
0.2 Vp-p
TP13 (REC,P.B)
VIDEO IN (at B/W)
0.2 Vp-p
TP3 (REC,P.B)
ACC OUT
0.44 Vp-p
TP2 (REC,P.B)
REC COLOR OUT
0.4 Vp-p
TP4 (REC,P.B)
GATED BURST
0.7 Vp-p
TP11 (REC,P.B)
VIDEO IN
1 Vp-p
TP14 (REC)
PRE-EMPHASIS
1.1 Vp-p
TP10 (REC,P.B)
GATE PULSE
4.4 Vp-p
TP15 (REC)
FM OUT
0.72 Vp-p
TP6 (REC,P.B)
BURST
0.6 Vp-p
TP7 (REC,P.B)
RECTIFIER
0.2 Vp-p
TP8 (REC)
KILLER OUT
0.05 Vp-p
TP8 (P.B)
KILLER OUT
0.036 Vp-p
TP9 (REC,P.B)
GATE PULSE
20 Vp-p
IC1 LA7016
IC2 LA7016
IC3 AN305
IC4 LA7016
IC5 AN6300
IC6 μPC741C
IC7 LA7016
IC9 LA7016
Q1 2SC460C
Q12 2SD638R
Q15 2SD638R
Q21 2SK30A-0Y
Q24 2SB641Q
X1 5.119166MHz PU31449-3
FREQ ADJ
B/W DEVIATION
COLOR DEVIATION
CARRIER SET
SYMMETORY
AGC LEVEL
DARK CLIP
WHITE CLIP
KILLER SET
POWER SUPPLY
BALANCE MOD
KILLER AMP
ACC AMP
ACC DET
BURST GATE
VIDEO AMP
B/W COLOR SW
COLOR AMP
CLAMP
PRE EMPH
FREQ MOD
AGC
AGC DET
SYNC SEP
WHITE DARK CLIP
LPF1
LPF2
LPF3
DLI
DL2
BPF1
PU46042-6 4.43MHz CT
PU48517-2
PU48515-6
PU48516-2
PU54128-2
PU54129
PU54064
PU30771-1
PU30771-3
PU30771-7
PU30770-5
TO 1 2 HEAD AMP
FROM 8 4 JUNCTION P845
TO 3 2 DRUM SERVO P323
FROM 9 5 CONNECTOR
DUB 12V OUT
DUB 12V IN
TV 12V IN
GND
SYNC OUT
LINE IN
TV IN
P102
P103
P105
P171 PB. COLOR
P125 HEAD AMP
9 5 CONNECTOR
P255 VIDEO SUB
P110 5.12MHz OUT
GND
DUB SW OUT
P104 FM DUB IN
P112 MANUAL VIDEO OUT
AGC VIDEO OUT
P124 HEAD AMP
REC COLOR OUT
H: VIDEO PB IN
P106 L: COLOR IN
L: B/W IN
1 6 PB COLOR
1 0 MODULATOR
P107 H: VIDEO PB OUT
P111 +12V OUT
P101 +12V IN
P172 PB COLOR
P252 VIDEO SUB
P450 REGULATOR
P113 VIDEO IN
P258 VIDEO SUB
H: FM CTL IN
P124 HEAD AMP
FM OUT

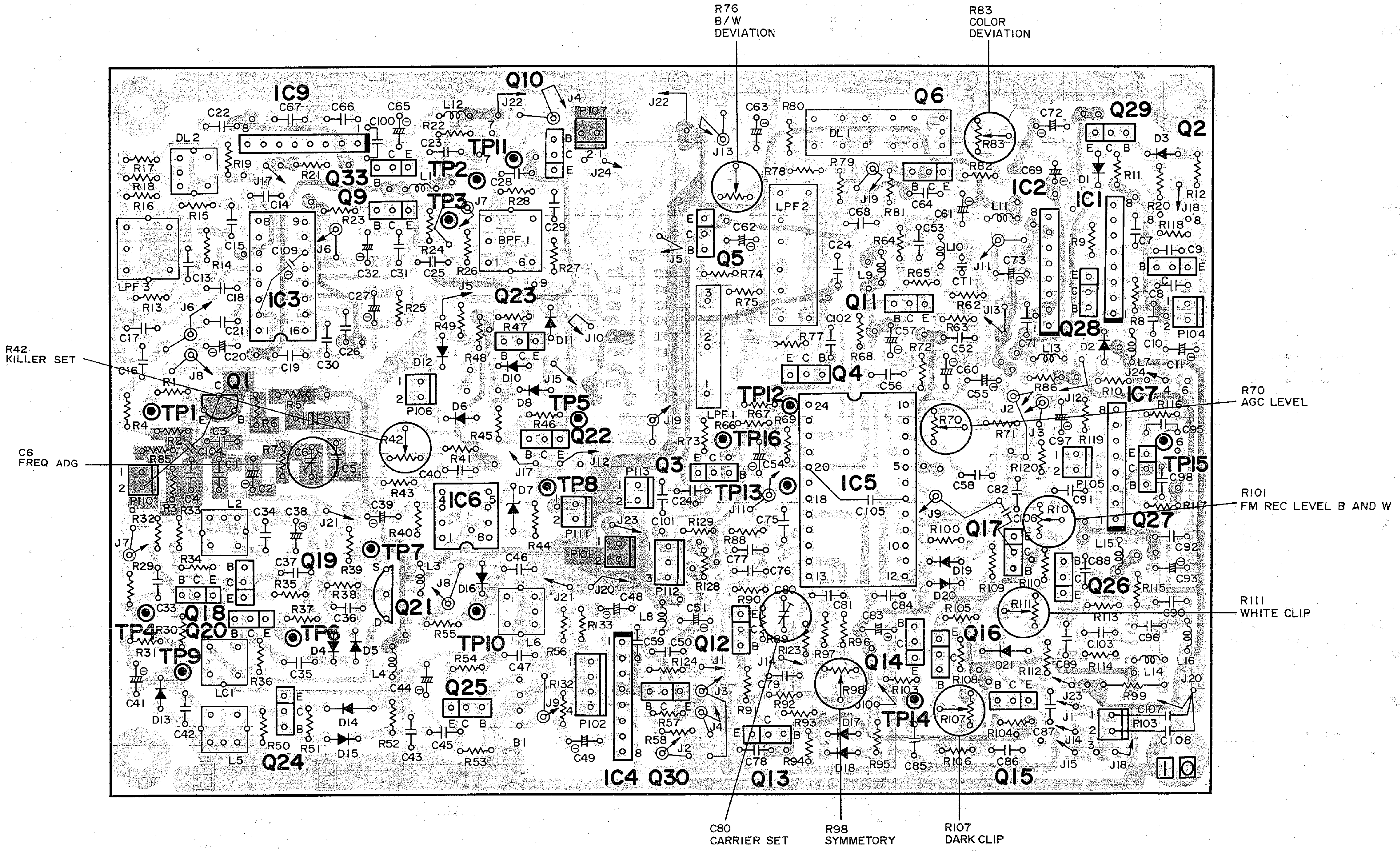
NOTE : UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE ISS133
ALL RESISTANCE VALUES ARE IN OHM (1/8W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACTANCE VALUES ARE IN μF

Note : 1 Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

MODULATOR SCHEMATIC
(REEL SERVO BLOCK)

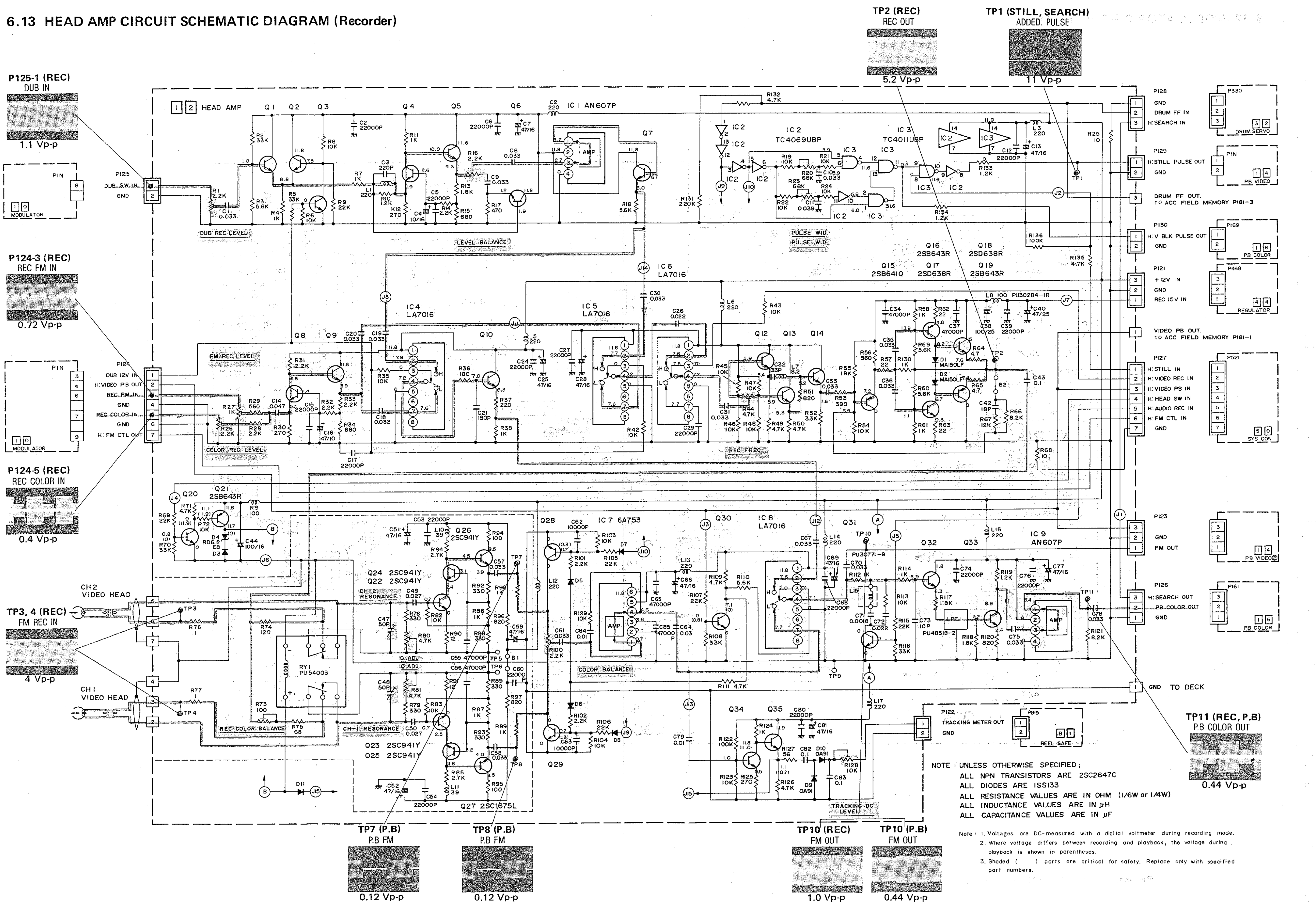
MODULATOR SCHEMATIC
(REEL SERVO BLOCK)

6.12 MODULATOR CIRCUIT BOARD


R76
B/W
DEVIATION
R83
COLOR
DEVIATION
R42
KILLER SET
C6
FREQ ADG
R70
AGC LEVEL
R101
FM REC LEVEL B AND W
R111
WHITE CLIP
C80
CARRIER SET
R98
SYMMETORY
R107
DARK CLIP
IC9
IC3
Q10
Q6
Q29
Q2
IC2
IC1
Q33
Q9
Q23
Q5
Q11
Q28
Q1
TP1
Q22
TP5
TP12
Q4
IC7
TP16
IC5
TP15
Q3
TP13
IC6
TP8
TP7
Q19
Q21
Q17
Q27
Q26
Q18
Q20
TP4
TP9
TP6
TP10
Q25
Q12
Q14
TP14
Q16
Q24
IC4
Q30
Q13
Q15

Red shaded parts : CP-5550E uses only these.

6.13 HEAD AMP CIRCUIT SCHEMATIC DIAGRAM (Recorder)



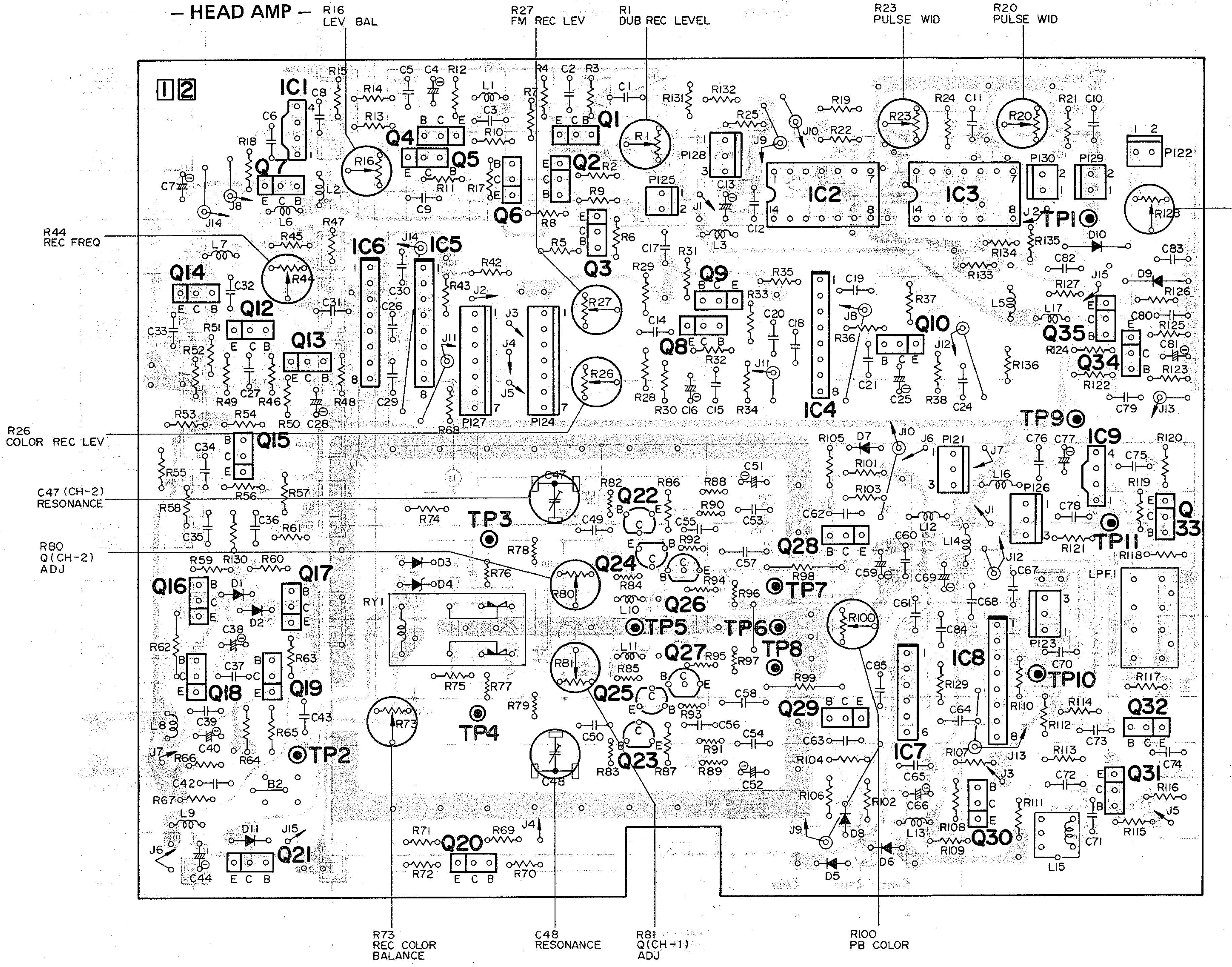
A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP2 (REC)
REC OUT
5.2 Vp-p
TP1 (STILL, SEARCH)
ADDED. PULSE
11 Vp-p
P125-1 (REC)
DUB IN
1.1 Vp-p
P124-3 (REC)
REC FM IN
0.72 Vp-p
P124-5 (REC)
REC COLOR IN
0.4 Vp-p
TP3, 4 (REC)
FM REC IN
4 Vp-p
TP7 (P.B)
P.B FM
0.12 Vp-p
TP8 (P.B)
P.B FM
0.12 Vp-p
TP10 (REC)
FM OUT
1.0 Vp-p
TP10 (P.B)
FM OUT
0.44 Vp-p
TP11 (REC, P.B)
P.B COLOR OUT
0.44 Vp-p
1 2 HEAD AMP
IC1 AN607P
IC2 TC4069UBP
IC3 TC4011UBP
IC4 LA7016
IC5 LA7016
IC6 LA7016
IC7 6A753
IC8 LA7016
IC9 AN607P
Q16 2SB643R
Q18 2SD638R
Q15 2SB641Q
Q17 2SD638R
Q19 2SB643R
Q21 2SB643R
Q24 2SC941Y
Q22 2SC941Y
Q26 2SC941Y
Q23 2SC941Y
Q25 2SC941Y
Q27 2SC1675L
RY1 PU54003
PU30284-IR
PU30771-9
PU48518-2
DUB REC LEVEL
LEVEL BALANCE
PULSE WID
FM REC LEVEL
COLOR REC LEVEL
REC FREQ
CH-2 RESONANCE
CH-1 RESONANCE
Q ADJ
REC COLOR BALANCE
COLOR BALANCE
TRACKING DC LEVEL
P125
DUB SW IN
GND
MODULATOR
P124
DUB 12V IN
H:VIDEO PB OUT
REC FM IN
REC COLOR IN
H: FM CTL OUT
CH2 VIDEO HEAD
CH1 VIDEO HEAD
P128
DRUM FF IN
H:SEARCH IN
P330
DRUM SERVO
P129
H:STILL PULSE OUT
PB VIDEO
DRUM FF OUT.
TO ACC FIELD MEMORY P181-3
P130
H:V BLK PULSE OUT
P169
PB COLOR
P121
+12V IN
REC 15V IN
P448
REGULATOR
VIDEO PB OUT.
TO ACC FIELD MEMORY P181-1
P127
H:STILL IN
H:VIDEO REC IN
H:VIDEO PB IN
H:HEAD SW IN
H:AUDIO REC IN
H:FM CTL IN
P521
SYS CON
P123
FM OUT
PB VIDEO②
P126
H:SEARCH OUT
PB COLOR OUT
P161
GND TO DECK
P122
TRACKING METER OUT
P815
REEL SAFE

NOTE : UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

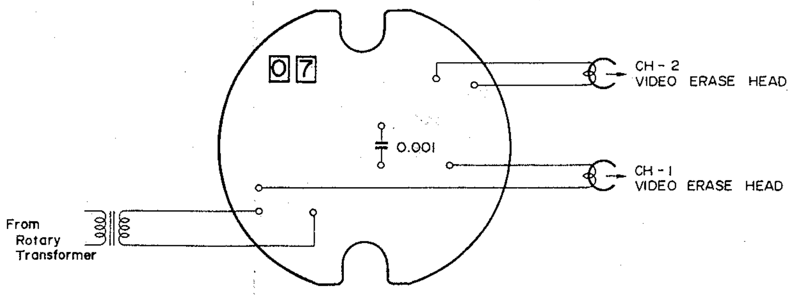
6.14 HEAD AMP, ERASE HEAD, VIDEO HEAD AND DRUM TERMINAL CIRCUIT BOARD (Recorder)

— HEAD AMP —



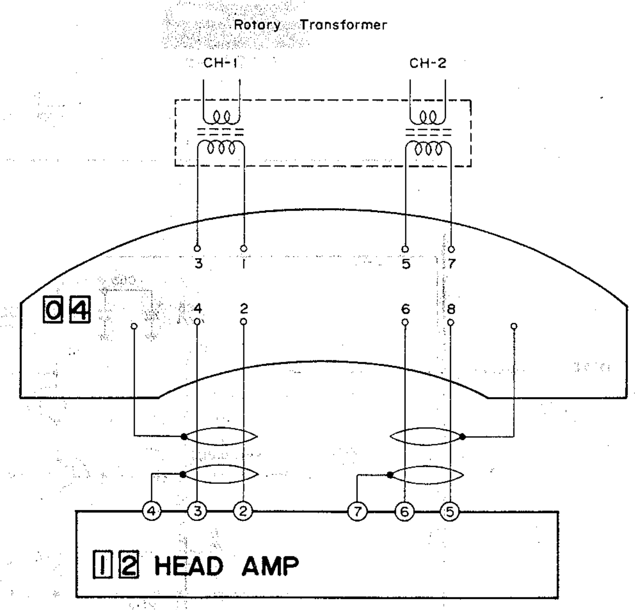
R16 LEV BAL
R27 FM REC LEV
R1 DUB REC LEVEL
R23 PULSE WID
R20 PULSE WID
R128 TRC DC LEV.
R44 REC FREQ
R26 COLOR REC LEV
C47 (CH-2) RESONANCE
R80 Q(CH-2) ADJ
R73 REC COLOR BALANCE
C48 RESONANCE
R81 Q(CH-1) ADJ
R100 PB COLOR
12
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
RY1
LPF1

— ERASE HEAD —



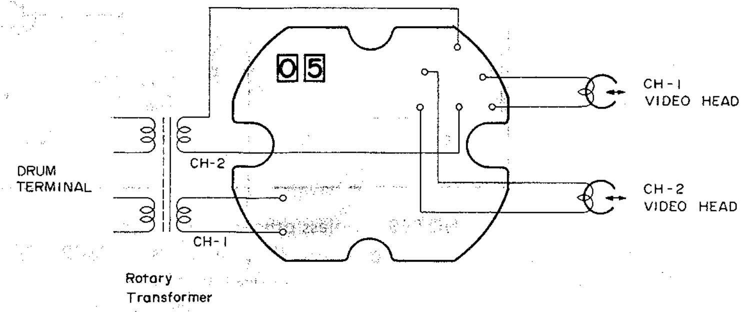
07
CH-2 VIDEO ERASE HEAD
CH-1 VIDEO ERASE HEAD
0.001
From Rotary Transformer

— DRUM —



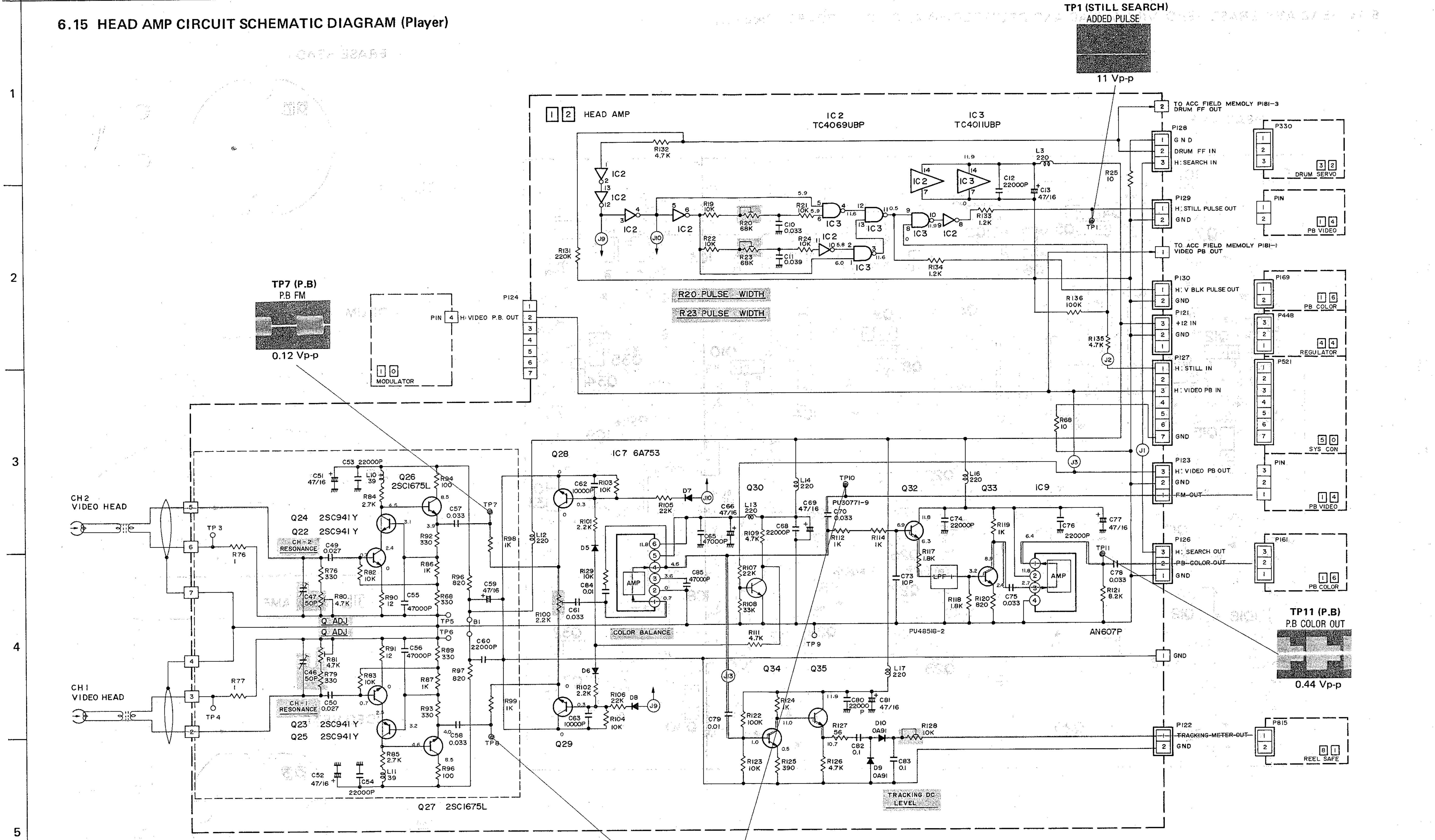
Rotary Transformer
CH-1
CH-2
04
12 HEAD AMP

— VIDEO HEAD —



05
CH-1 VIDEO HEAD
CH-2 VIDEO HEAD
DRUM TERMINAL
CH-2
CH-1
Rotary Transformer

6.15 HEAD AMP CIRCUIT SCHEMATIC DIAGRAM (Player)

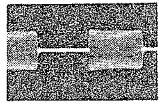

A
B
C
D
E
F
G
H
1
2
3
4
5
TP1 (STILL SEARCH)
ADDED PULSE
11 Vp-p
1 2 HEAD AMP
IC2
TC4069UBP
IC3
TC4011UBP
R132 4.7K
R131 220K
R19 10K
R20 68K
R21 10K
C10 0.033
R22 10K
R23 68K
R24 10K
C11 0.039
L3 220
C12 22000P
C13 47/16
R25 10
R133 1.2K
R134 1.2K
R136 100K
R135 4.7K
R68 10
TP1
J1
J2
J3
J9
J10
J13
TO ACC FIELD MEMOLY P181-3 DRUM FF OUT
P128
GND
DRUM FF IN
H: SEARCH IN
P330
3 2
DRUM SERVO
P129
H: STILL PULSE OUT
GND
PIN
1 4
PB VIDEO
TO ACC FIELD MEMOLY P181-1 VIDEO PB OUT
P130
H: V BLK PULSE OUT
GND
P169
1 6
PB COLOR
P121
+12 IN
GND
P448
4 4
REGULATOR
P127
H: STILL IN
H: VIDEO PB IN
GND
P521
5 0
SYS CON
P123
H: VIDEO PB OUT
GND
FM OUT
PIN
1 4
PB VIDEO
P126
H: SEARCH OUT
PB COLOR OUT
GND
P161
1 6
PB COLOR
GND
P122
TRACKING METER OUT
GND
P815
8 1
REEL SAFE
R20 PULSE WIDTH
R23 PULSE WIDTH
TP7 (P.B)
P.B FM
0.12 Vp-p
P124
PIN 4 H: VIDEO P.B. OUT
1 0
MODULATOR
CH 2 VIDEO HEAD
CH 1 VIDEO HEAD
TP 3
TP 4
R76 1
R77 1
C53 22000P
C51 47/16
L10 39
R84 2.7K
Q26 2SC1675L
R94 100
Q24 2SC941Y
Q22 2SC941Y
C57 0.033
TP7
R92 330
CH-2 RESONANCE
C49 0.027
R76 330
R82 10K
R86 1K
C47 50P
R80 4.7K
R90 12
C55 47000P
R66 330
R96 820
C59 47/16
Q ADJ
TP5
TP6
B1
R91 12
C56 47000P
R89 330
C60 22000P
R81 4.7K
R79 330
C46 50P
R83 10K
R87 1K
R97 820
CH-1 RESONANCE
C50 0.027
R93 330
Q23 2SC941Y
Q25 2SC941Y
C58 0.033
TP8
R85 2.7K
L11 39
R96 100
C52 47/16
C54 22000P
Q27 2SC1675L
R98 1K
R99 1K
L12 220
Q28
Q29
IC7 6A753
C62 10000P
R103 10K
R101 2.2K
D5
R129 10K
C84 0.01
AMP
C61 0.033
R100 2.2K
COLOR BALANCE
D6
R102 2.2K
R106 22K
D8
R104 10K
C63 10000P
R105 22K
D7
C66 47/16
C65 47000P
C85 47000P
Q30
L13 220
R109 4.7K
C68 22000P
R107 22K
R108 33K
R111 4.7K
L14 220
C69 47/16
TP10
PU30771-9
C70 0.033
R112 1K
R114 1K
TP 9
Q32
Q33
IC9
L16 220
C74 22000P
R119 1K
C76 22000P
C77 47/16
R117 1.8K
C73 10P
LPF
R118 1.8K
R120 820
C75 0.033
AMP
TP11
C78 0.033
R121 8.2K
PU48518-2
AN607P
Q34
Q35
L17 220
R124 1K
C80 22000P
C81 47/16
C79 0.01
R122 100K
R127 56
C82 0.1
D10 OA91
R128 10K
R123 10K
R125 390
R126 4.7K
D9 OA91
C83 0.1
TRACKING DC LEVEL
TP11 (P.B)
P.B COLOR OUT
0.44 Vp-p

NOTES: Unless otherwise specified;

1. All NPN transistors are 2SC2647C
2. All diodes are 1SS133
3. All resistance values are in ohm (1/6 W or 1/4 W)
4. All inductance values are in μH
5. All capacitance values are in μF

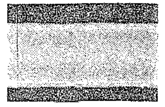
Voltages are DC-measures with a digital voltmeter during playback mode.

TP8 (P.B)
P.B FM



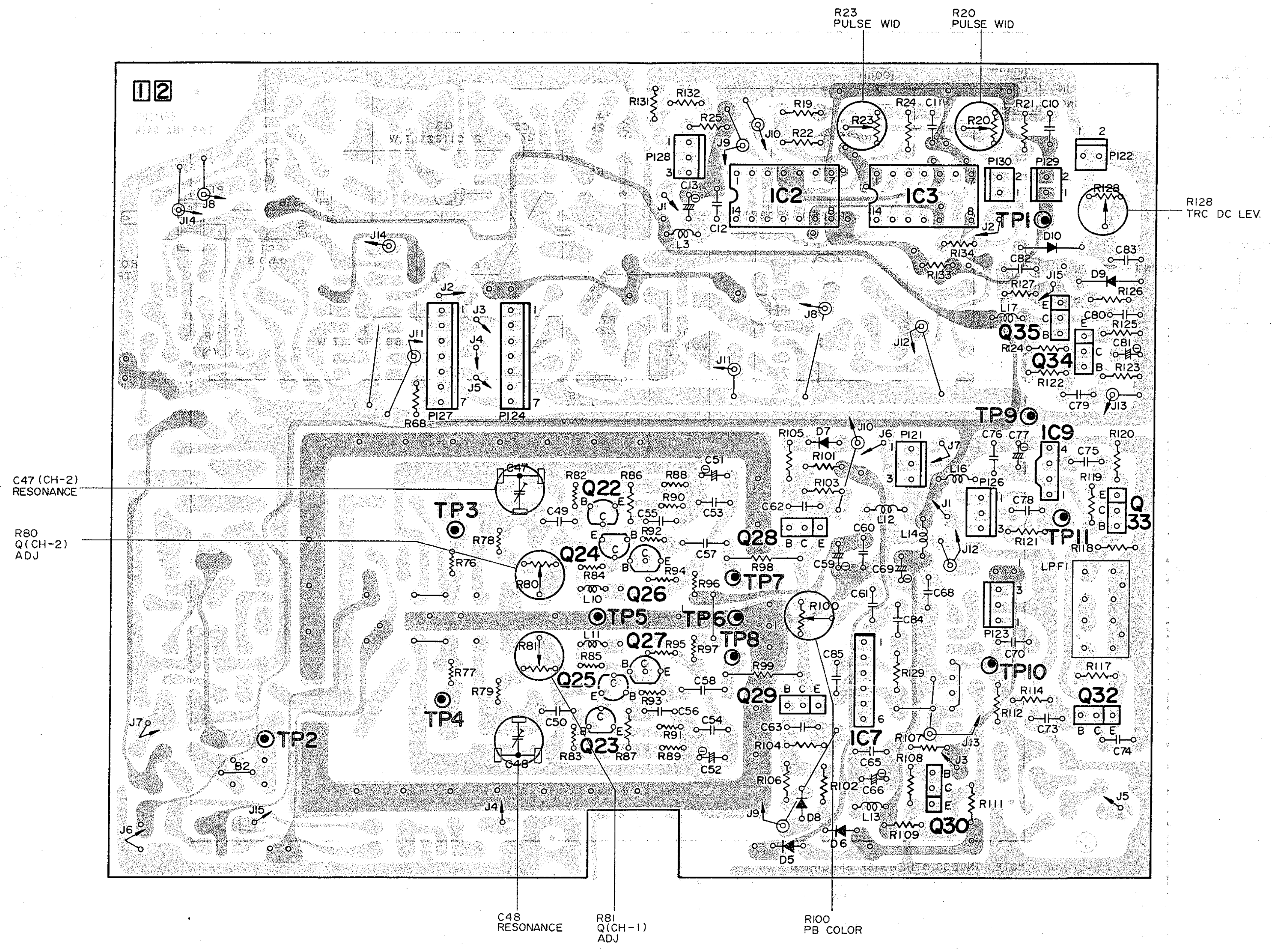
0.12 Vp-p

TP10 (P.B)
FM OUT

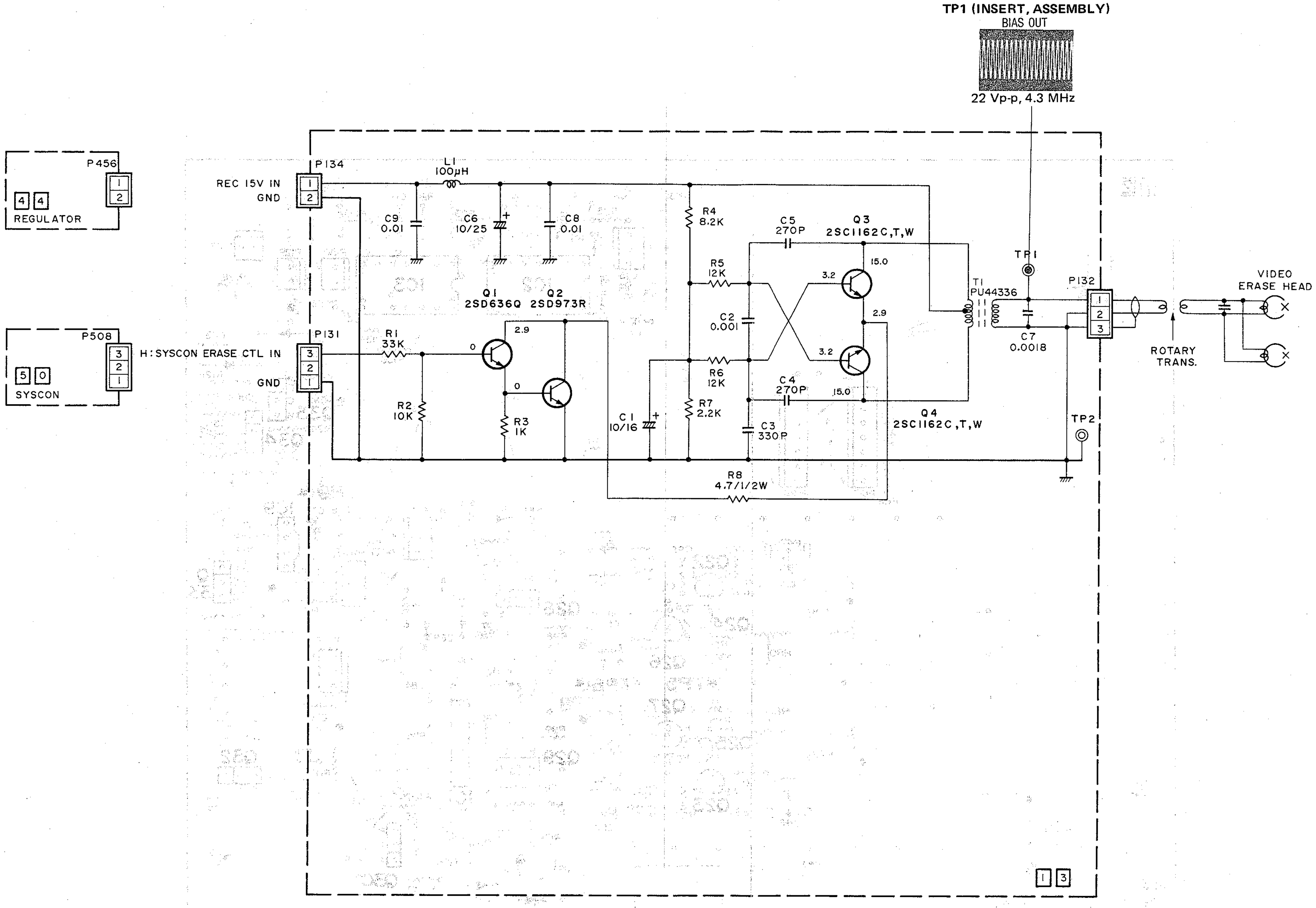


0.44 Vp-p

6.16 HEAD AMP CIRCUIT BOARD (Player)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
R23
PULSE WID
R20
PULSE WID
R128
TRC DC LEV.
C47 (CH-2)
RESONANCE
R80
Q(CH-2)
ADJ
C48
RESONANCE
R81
Q(CH-1)
ADJ
R100
PB COLOR
IC2
IC3
IC7
IC9
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q32
Q33
Q34
Q35
P121
P122
P123
P124
P126
P127
P128
P129
P130
LPF1
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
D5
D6
D7
D8
D9
D10
L3
L10
L11
L12
L13
L14
L16
L17
R131
R132
R25
R19
R22
R24
C11
R21
C10
C13
C12
R134
R133
C82
C83
R127
R126
C80
R125
C81
R124
R123
R122
C79
R68
R105
R101
R103
C76
C77
C75
R120
R119
C78
R121
R118
C51
R82
R86
R88
R90
C49
C55
C53
R92
C62
C60
R78
R76
R84
R94
C57
R98
C59
C69
R96
C61
C68
C84
R85
R95
R97
C85
R99
R129
C70
R117
R77
R79
C50
R93
C58
C56
R114
R112
C73
C74
R83
R87
R89
C54
C52
C63
R104
C65
R107
R108
R106
R102
C66
R109
R111
B2

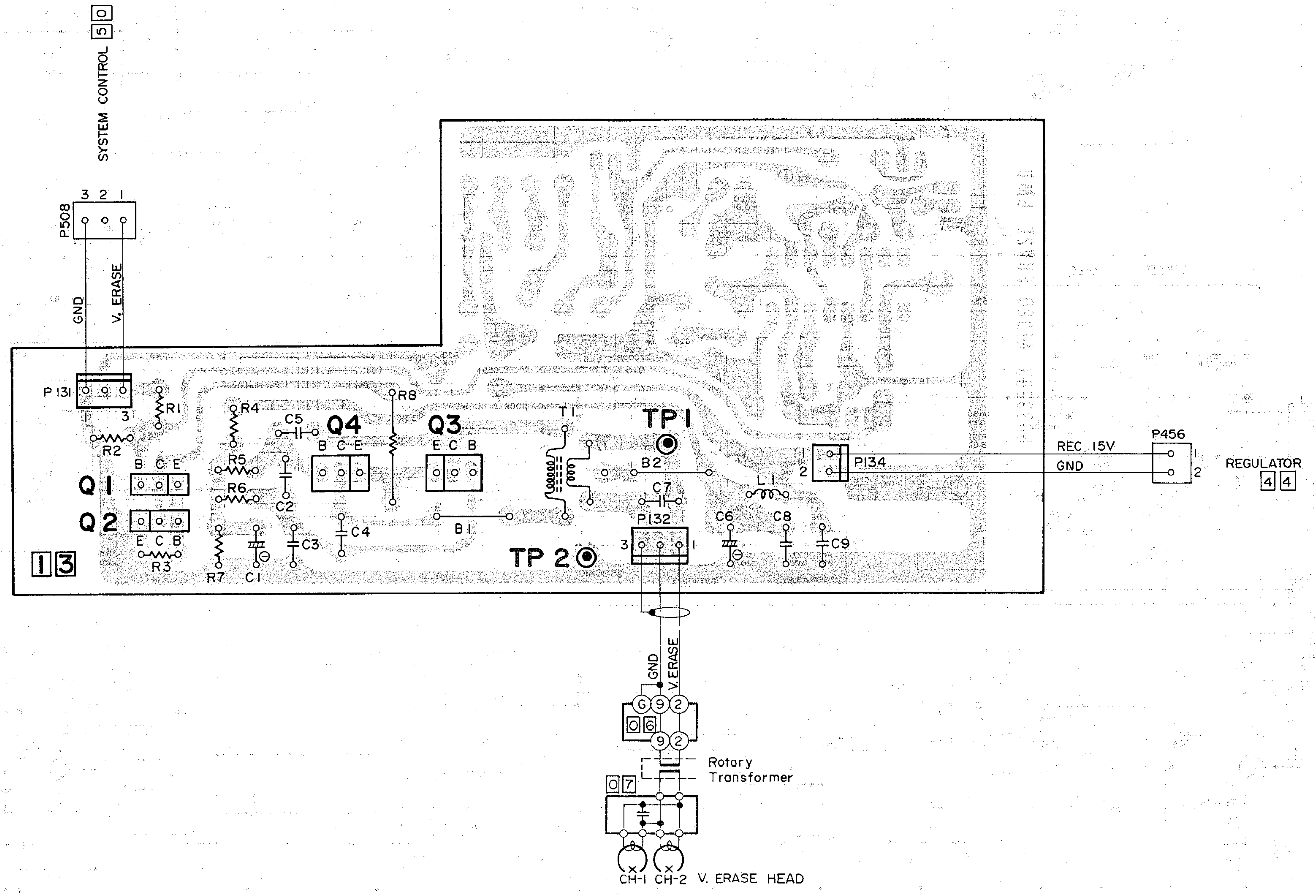
6.17 VIDEO ERASE AMP CIRCUIT SCHEMATIC DIAGRAM (CR-8250E only)


TP1 (INSERT, ASSEMBLY)
BIAS OUT
22 Vp-p, 4.3 MHz
P456
1
2
4 4
REGULATOR
P134
REC 15V IN
GND
L1
100μH
C9
0.01
C6
10/25
C8
0.01
R4
8.2K
C5
270P
Q3
2SC1162C,T,W
15.0
3.2
R5
12K
C2
0.001
2.9
T1
PU44336
TP1
P132
VIDEO
ERASE HEAD
Q1
2SD636Q
Q2
2SD973R
2.9
P508
3
2
1
5 0
SYSCON
H:SYSCON ERASE CTL IN
P131
GND
R1
33K
0
0
R2
10K
R3
1K
C1
10/16
R6
12K
R7
2.2K
C4
270P
15.0
3.2
Q4
2SC1162C,T,W
C3
330P
C7
0.0018
ROTARY
TRANS.
TP2
R8
4.7/1/2W
1 3

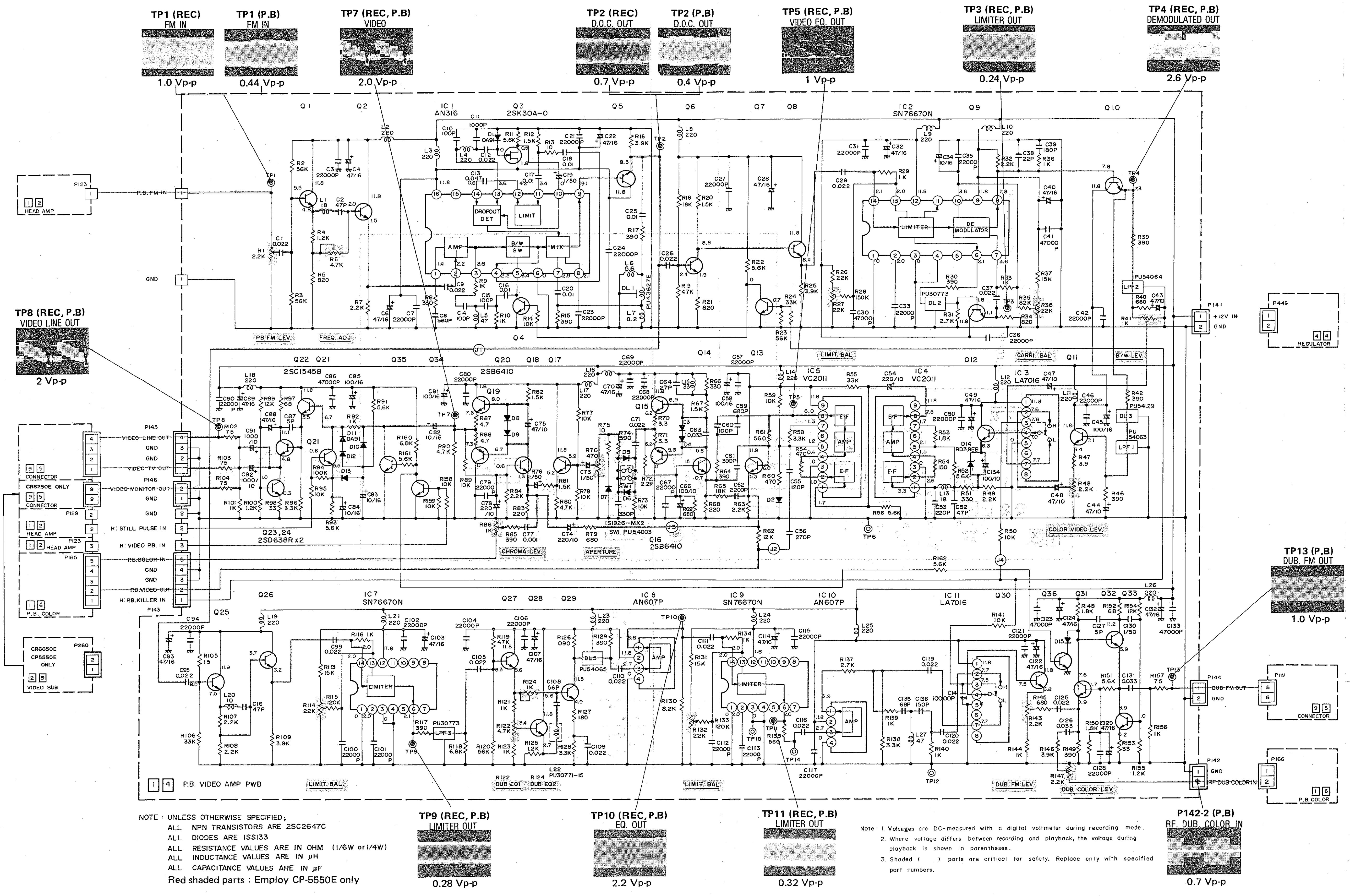
NOTE : UNLESS OTHERWISE SPECIFIED :
1. ALL RESISTOR VALUES ARE IN OHM 1/8W
2. ALL CAPACITANCE VALUES ARE IN μF
+|⊪— ELECTROLYTIC
—||— MYLAR OR CERAMIC

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6.18 VIDEO ERASE AMP CIRCUIT BOARD (CR-8250E only)


SYSTEM CONTROL
50
P508
3 2 1
GND
V. ERASE
P131
1
3
R1
R2
Q1
B C E
Q2
E C B
R3
13
R4
C5
Q4
B C E
R5
R6
C2
R7
C1
C3
C4
R8
Q3
E C B
T1
TP1
TP 2
B2
C7
B1
L1
P132
3
1
C6
C8
C9
P134
1
2
REC 15V
GND
P456
1
2
REGULATOR
44
GND
V. ERASE
G 9 2
06
9 2
Rotary
Transformer
07
CH-1
CH-2
V. ERASE HEAD

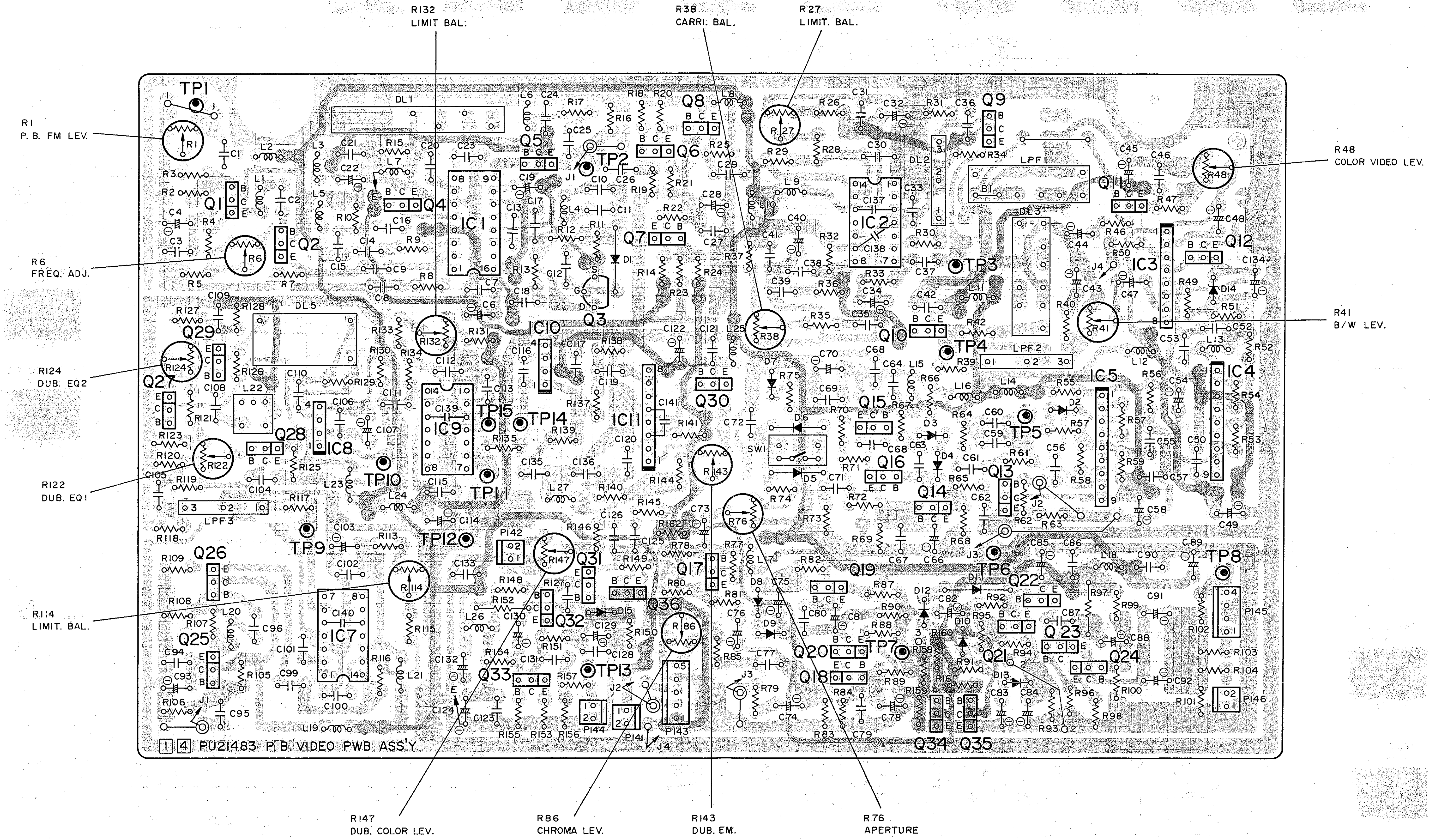
6.19 PLAYBACK VIDEO CIRCUT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP1 (REC) FM IN 1.0 Vp-p
TP1 (P.B) FM IN 0.44 Vp-p
TP7 (REC, P.B) VIDEO 2.0 Vp-p
TP2 (REC) D.O.C. OUT 0.7 Vp-p
TP2 (P.B) D.O.C. OUT 0.4 Vp-p
TP5 (REC, P.B) VIDEO EQ. OUT 1 Vp-p
TP3 (REC, P.B) LIMITER OUT 0.24 Vp-p
TP4 (REC, P.B) DEMODULATED OUT 2.6 Vp-p
TP8 (REC, P.B) VIDEO LINE OUT 2 Vp-p
TP13 (P.B) DUB. FM OUT 1.0 Vp-p
TP9 (REC, P.B) LIMITER OUT 0.28 Vp-p
TP10 (REC, P.B) EQ. OUT 2.2 Vp-p
TP11 (REC, P.B) LIMITER OUT 0.32 Vp-p
P142-2 (P.B) RF. DUB. COLOR IN 0.7 Vp-p
IC1 AN316
IC2 SN76670N
IC3 LA7016
IC4 VC2011
IC5 VC2011
IC7 SN76670N
IC8 AN607P
IC9 SN76670N
IC10 AN607P
IC11 LA7016
Q3 2SK30A-O
2SC1545B
2SB6410
Q23,24 2SD638R x2
Q16 2SB6410
DROPOUT DET
LIMIT
AMP
B/W SW
MIX
LIMITER
DE MODULATOR
E-F
PU30773
PU54064
PU54129
PU54063
PU54065
PU30771-15
PU4382E
DL1
DL2
DL3
DL5
LPF1
LPF2
LPF3
SWI PU54003
ISI926-MX2
P123 HEAD AMP
P.B. FM IN
GND
P145
VIDEO LINE OUT
VIDEO TV OUT
P146
VIDEO MONITOR OUT
9 5 CONNECTOR
CR8250E ONLY
P129
H: STILL PULSE IN
H: VIDEO PB. IN
P165
PB.COLOR IN
PB.VIDEO OUT
H: P.B.KILLER IN
1 6 P.B. COLOR
P143
CR6650E CP5550E ONLY
P260
2 5 VIDEO SUB
P141 +12V IN GND
P449
4 4 REGULATOR
P144 DUB FM OUT GND
PIN
P142 GND RF DUB COLOR IN
P166
1 4 P.B. VIDEO AMP PWB
PB FM LEV.
FREQ. ADJ.
LIMIT. BAL.
CARRI. BAL.
B/W LEV.
COLOR VIDEO LEV.
CHROMA LEV.
APERTURE
DUB EQ1
DUB EQ2
DUB FM LEV.
DUB COLOR LEV.

NOTE : UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE ISS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W or1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF
Red shaded parts : Employ CP-5550E only

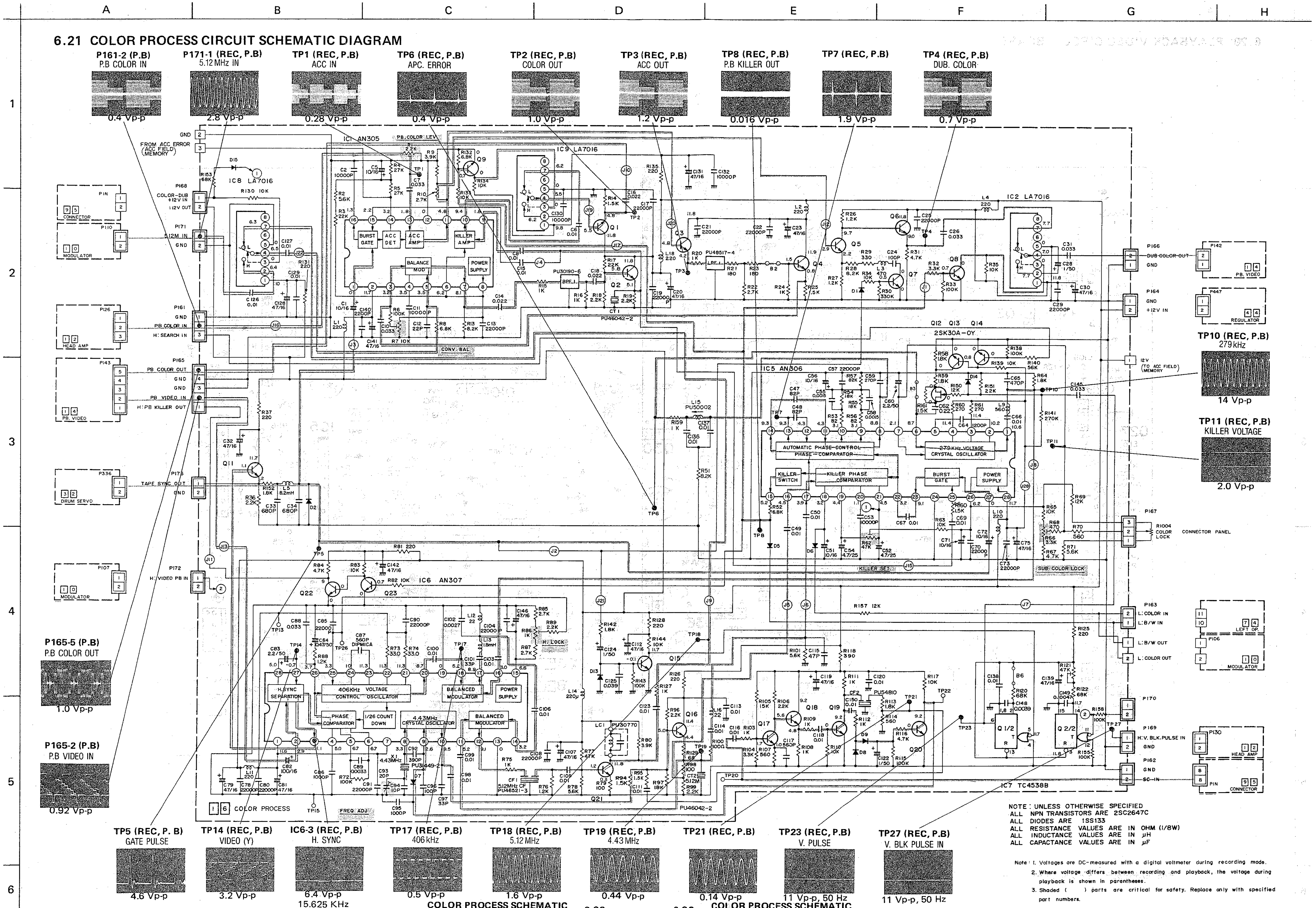
Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6.20 PLAYBACK VIDEO CIRCUIT BOARD


R132
LIMIT BAL.
R38
CARRI. BAL.
R27
LIMIT. BAL.
R1
P. B. FM LEV.
R48
COLOR VIDEO LEV.
R6
FREQ. ADJ.
R41
B/W LEV.
R124
DUB. EQ2
R122
DUB. EQ1
R114
LIMIT. BAL.
R147
DUB. COLOR LEV.
R86
CHROMA LEV.
R143
DUB. EM.
R76
APERTURE
1 4 PU21483 P.B. VIDEO PWB ASS'Y

▨ Red shaded parts : Employ CP-5550E only.

6.21 COLOR PROCESS CIRCUIT SCHEMATIC DIAGRAM

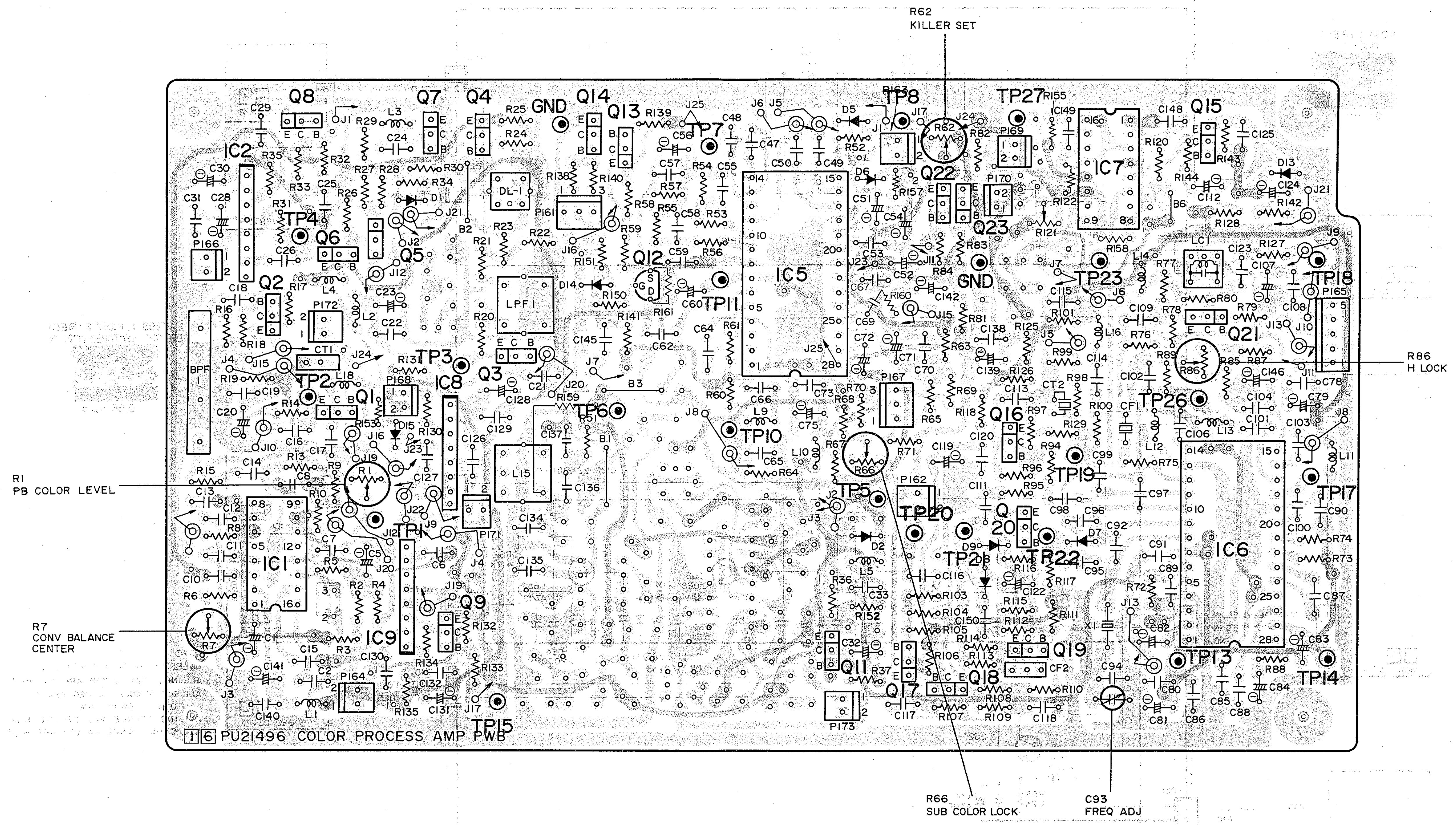

A
B
C
D
E
F
G
H
1
2
3
4
5
6
P161-2 (P.B)
P.B COLOR IN
0.4 Vp-p
P171-1 (REC, P.B)
5.12MHz IN
2.8 Vp-p
TP1 (REC, P.B)
ACC IN
0.28 Vp-p
TP6 (REC, P.B)
APC. ERROR
0.4 Vp-p
TP2 (REC, P.B)
COLOR OUT
1.0 Vp-p
TP3 (REC, P.B)
ACC OUT
1.2 Vp-p
TP8 (REC, P.B)
P.B KILLER OUT
0.016 Vp-p
TP7 (REC, P.B)
1.9 Vp-p
TP4 (REC, P.B)
DUB. COLOR
0.7 Vp-p
TP10 (REC, P.B)
279kHz
14 Vp-p
TP11 (REC, P.B)
KILLER VOLTAGE
2.0 Vp-p
P165-5 (P.B)
P.B COLOR OUT
1.0 Vp-p
P165-2 (P.B)
P.B VIDEO IN
0.92 Vp-p
TP5 (REC, P.B)
GATE PULSE
4.6 Vp-p
TP14 (REC, P.B)
VIDEO (Y)
3.2 Vp-p
IC6-3 (REC, P.B)
H. SYNC
6.4 Vp-p
15.625 KHz
TP17 (REC, P.B)
406 kHz
0.5 Vp-p
TP18 (REC, P.B)
5.12 MHz
1.6 Vp-p
TP19 (REC, P.B)
4.43 MHz
0.44 Vp-p
TP21 (REC, P.B)
0.14 Vp-p
TP23 (REC, P.B)
V. PULSE
11 Vp-p, 50 Hz
TP27 (REC, P.B)
V. BLK PULSE IN
11 Vp-p, 50 Hz
IC1 AN305
IC2 LA7016
IC5 AN306
IC6 AN307
IC7 TC4538B
IC8 LA7016
IC9 LA7016
BURST GATE
ACC DET
ACC AMP
KILLER AMP
BALANCE MOD
POWER SUPPLY
AUTOMATIC PHASE-CONTROL PHASE-COMPARATOR
279KHz VOLTAGE CRYSTAL OSCILLATOR
KILLER SWITCH
KILLER PHASE COMPARATOR
H.SYNC SEPARATION
406KHz VOLTAGE CONTROL OSCILLATOR
BALANCED MODULATOR
PHASE COMPARATOR
1/26 COUNT DOWN
4.43MHz CRYSTAL OSCILLATOR
Q1/2
Q2/2
PU30190-6
PU48517-4
PU46042-2
PU50002
PU30770
PU54810
PU46521-3
2SK30A-0Y
P.B COLOR LEV
CONV. BAL
KILLER SET
SUB COLOR LOCK
H. LOCK
FREQ ADJ
FROM ACC ERROR (ACC FIELD) (MEMORY)
P168 COLOR-DUB +12V IN 12V OUT
P171 5.12M IN GND
P161 GND PB COLOR IN H: SEARCH IN
P165 PB COLOR OUT GND GND PB VIDEO IN H: PB KILLER OUT
P173 TAPE SYNC OUT GND
P172 H: VIDEO PB IN
P166 DUB COLOR OUT GND
P164 GND +12V IN
12V (TO ACC FIELD) (MEMORY)
P167 R1004 COLOR LOCK CONNECTOR PANEL
P163 L: COLOR IN L: B/W IN L: B/W OUT L: COLOR OUT
P170
P169 H: V. BLK. PULSE IN GND
P162 GND SC IN
9 5 CONNECTOR
1 0 MODULATOR
1 2 HEAD AMP
1 4 PB. VIDEO
3 2 DRUM SERVO
1 4 PB. VIDEO
4 4 REGULATOR
7 4 LEFT OP.
1 0 MODULATOR
1 2 HEAD AMP
9 5 CONNECTOR
1 6 COLOR PROCESS

NOTE : UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/8W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACTANCE VALUES ARE IN μF

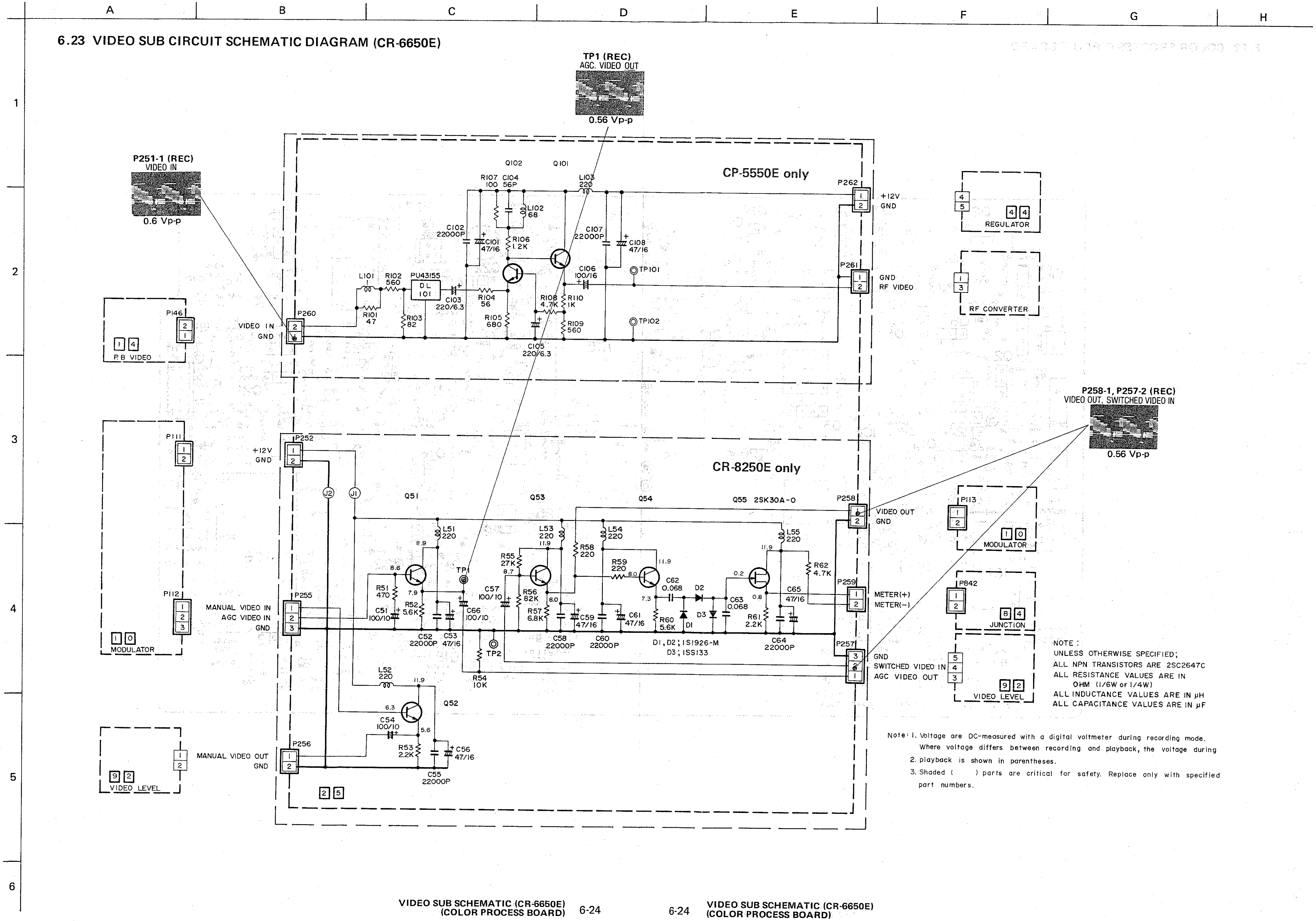
Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6-22 COLOR PROCESS SCHEMATIC (PLAYBACK VIDEO BOARD)

6.22 COLOR PROCESS CIRCUIT BOARD


R62
KILLER SET
R86
H LOCK
R1
PB COLOR LEVEL
R7
CONV BALANCE
CENTER
R66
SUB COLOR LOCK
C93
FREQ ADJ
PU21496 COLOR PROCESS AMP PWB
IC1
IC2
IC5
IC6
IC7
IC8
IC9
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP10
TP11
TP13
TP14
TP15
TP17
TP18
TP19
TP20
TP21
TP22
TP23
TP26
TP27
GND
DL-1
LPF1
L15
BPF 1
CT1
CT2
CF1
CF2
LC1
X1

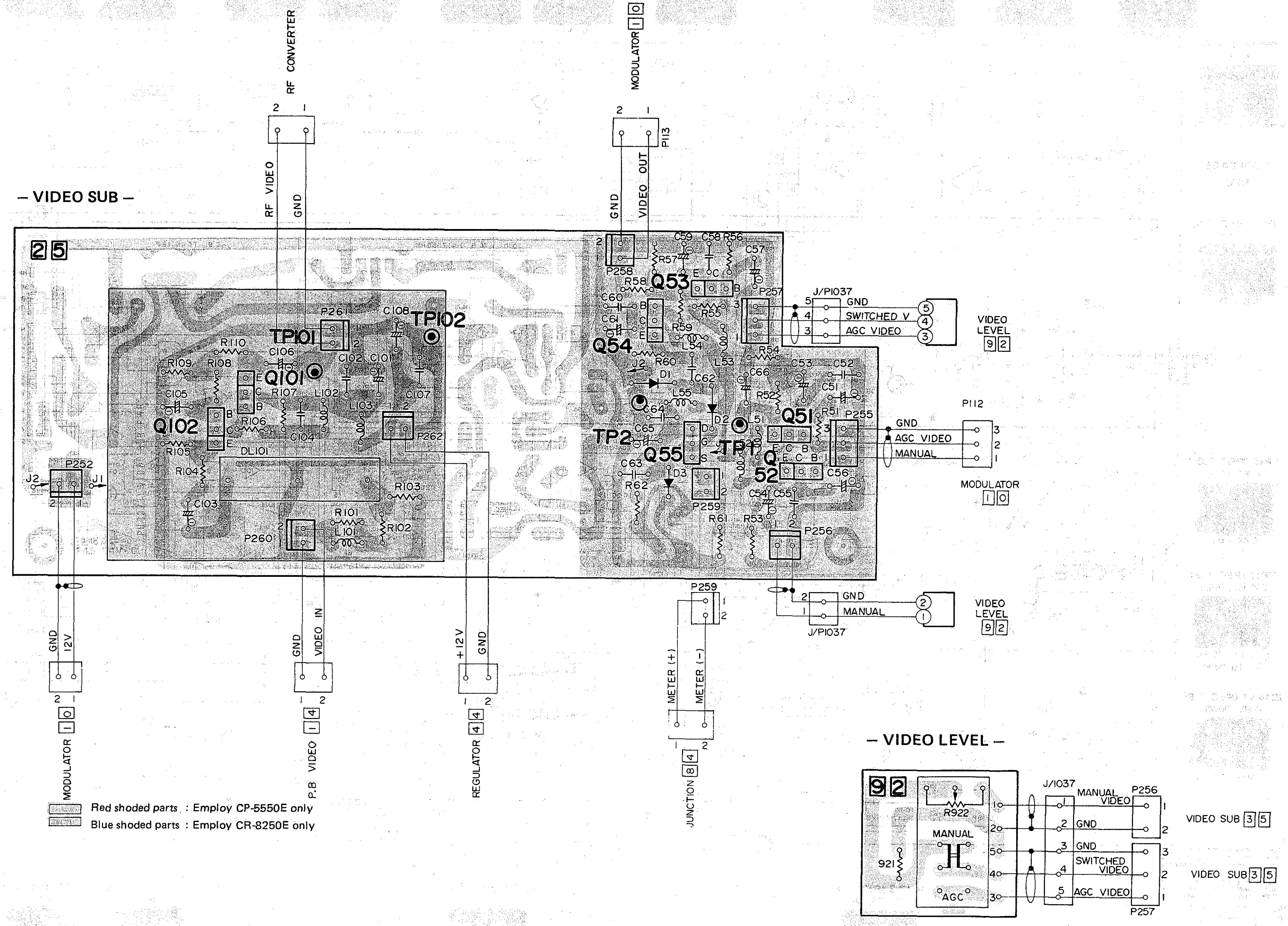
6.23 VIDEO SUB CIRCUIT SCHEMATIC DIAGRAM (CR-6650E)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP1 (REC)
AGC. VIDEO OUT
0.56 Vp-p
P251-1 (REC)
VIDEO IN
0.6 Vp-p
CP-5550E only
Q102
Q101
R107 100
C104 56P
L103 220
L102 68
C102 22000P
C101 47/16
R106 1.2K
C107 22000P
C108 47/16
C106 100/16
TP101
TP102
L101
R102 560
PU43155
DL 101
C103 220/6.3
R104 56
R108 4.7K
R110 1K
R101 47
R103 82
R105 680
R109 560
C105 220/6.3
P262
+12V
GND
P261
GND
RF VIDEO
P260
VIDEO IN
GND
P146
P.B VIDEO
REGULATOR
RF CONVERTER
P258-1, P257-2 (REC)
VIDEO OUT. SWITCHED VIDEO IN
0.56 Vp-p
P111
P252
+12V
GND
CR-8250E only
J2
J1
Q51
Q53
Q54
Q55 2SK30A-O
P258
VIDEO OUT
GND
P113
MODULATOR
L51 220
L53 220
L54 220
L55 220
R55 27K
R58 220
R59 220
R62 4.7K
TP1
C57 100/10
R56 82K
C62 0.068
D2
C63 0.068
C65 47/16
P259
METER(+)
METER(−)
P842
JUNCTION
R51 470
C51 100/10
R52 5.6K
C66 100/10
R57 6.8K
C59 47/16
C61 47/16
R60 5.6K
D1
D3
R61 2.2K
C52 22000P
C53 47/16
C58 22000P
C60 22000P
D1, D2 ; 1S1926-M
D3 ; 1SS133
C64 22000P
P257
GND
SWITCHED VIDEO IN
AGC VIDEO OUT
VIDEO LEVEL
P112
MANUAL VIDEO IN
AGC VIDEO IN
GND
P255
TP2
R54 10K
L52 220
Q52
C54 100/10
R53 2.2K
C55 22000P
C56 47/16
P256
MANUAL VIDEO OUT
GND
MODULATOR
VIDEO LEVEL
11.9
8.6
7.9
8.7
8.0
7.3
0.2
0.8
6.3
5.6

NOTE :
UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC2647C
ALL RESISTANCE VALUES ARE IN OHM (1/6W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF

Note: 1. Voltage are DC-measured with a digital voltmeter during recording mode. Where voltage differs between recording and playback, the voltage during
2. playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6.24 VIDEO SUB AND VIDEO LEVEL CIRCUIT BOARD (CR-6650E)

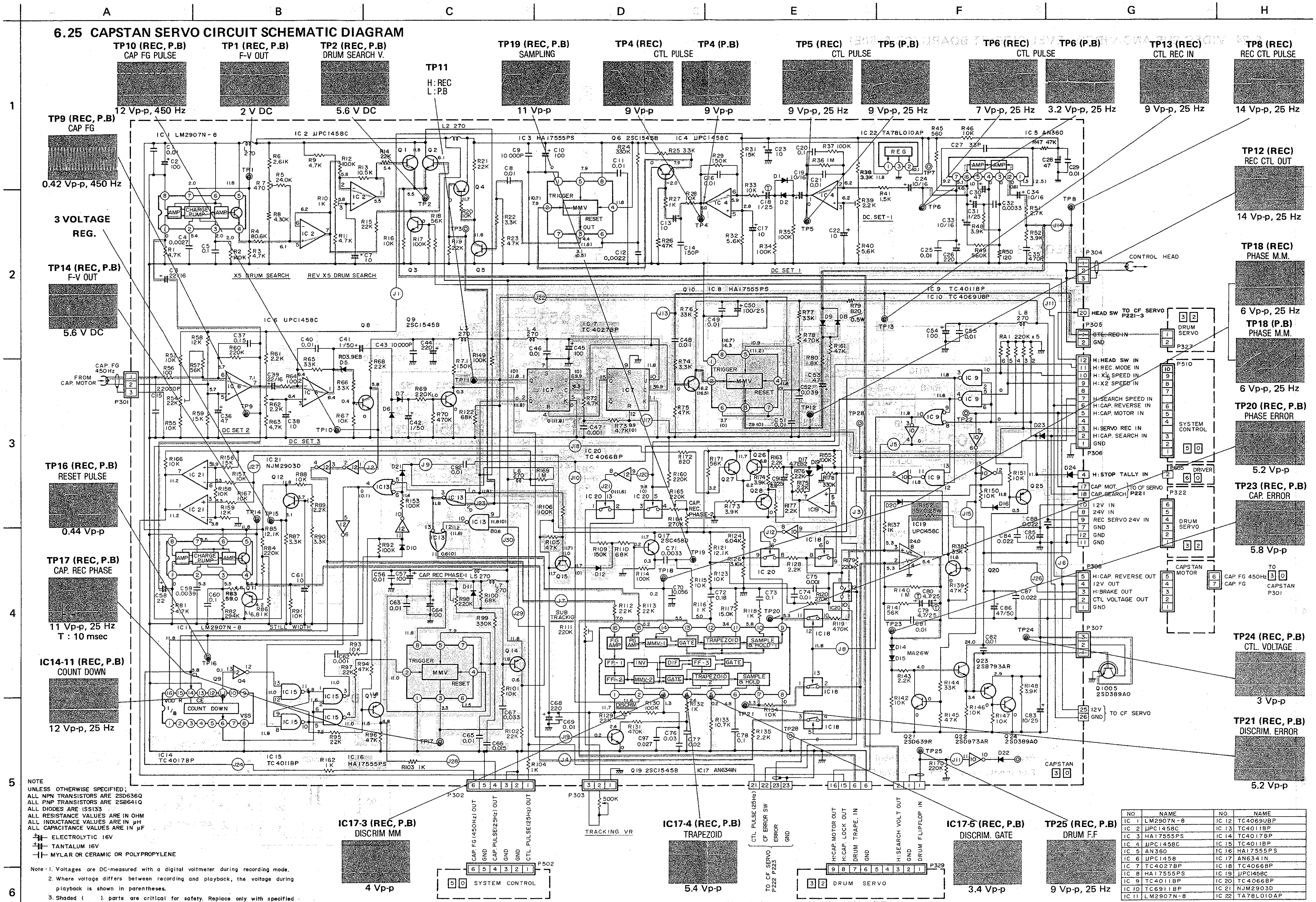


A
B
C
D
E
F
G
H
1
2
3
4
5
6
— VIDEO SUB —
25
RF CONVERTER
RF VIDEO
GND
MODULATOR 10
GND
VIDEO OUT
P113
P258
P261
P262
P252
P260
P257
P255
P256
P259
TP101
TP102
TP1
TP2
Q101
Q102
Q51
Q52
Q53
Q54
Q55
DL101
J1
J2
R101
R102
R103
R104
R105
R106
R107
R108
R109
R110
C101
C102
C103
C104
C105
C106
C107
C108
L101
L102
L103
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R62
C51
C52
C53
C54
C55
C56
C57
C58
C59
C60
C61
C62
C63
C64
C65
C66
L51
L53
L54
L55
D1
D2
D3
J/P1037
GND
SWITCHED V
AGC VIDEO
VIDEO LEVEL 92
P112
GND
AGC VIDEO
MANUAL
MODULATOR 10
GND
MANUAL
VIDEO LEVEL 92
GND
12V
MODULATOR 10
GND
VIDEO IN
P.B VIDEO 14
+12V
GND
REGULATOR 44
METER (+)
METER (−)
JUNCTION 84
— VIDEO LEVEL —
92
R922
MANUAL
921
AGC
J/1037
MANUAL VIDEO
GND
GND
SWITCHED VIDEO
AGC VIDEO
P256
P257
VIDEO SUB 35
VIDEO SUB 35

▨ *Red shoded parts* : Employ CP-5550E only

▨ *Blue shoded parts* : Employ CR-8250E only

6.25 CAPSTAN SERVO CIRCUIT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP10 (REC, P.B)
CAP FG PULSE
12 Vp-p, 450 Hz
TP1 (REC, P.B)
F-V OUT
2 V DC
TP2 (REC, P.B)
DRUM SEARCH V.
5.6 V DC
TP11
H: REC
L: P.B
TP19 (REC, P.B)
SAMPLING
11 Vp-p
TP4 (REC)
CTL PULSE
9 Vp-p
TP4 (P.B)
9 Vp-p
TP5 (REC)
CTL PULSE
9 Vp-p, 25 Hz
TP5 (P.B)
9 Vp-p, 25 Hz
TP6 (REC)
CTL PULSE
7 Vp-p, 25 Hz
TP6 (P.B)
3.2 Vp-p, 25 Hz
TP13 (REC)
CTL REC IN
9 Vp-p, 25 Hz
TP8 (REC)
REC CTL PULSE
14 Vp-p, 25 Hz
TP9 (REC, P.B)
CAP FG
0.42 Vp-p, 450 Hz
3 VOLTAGE REG.
TP14 (REC, P.B)
F-V OUT
5.6 V DC
TP12 (REC)
REC CTL OUT
TP8 (P.B)
14 Vp-p, 25 Hz
TP18 (REC)
PHASE M.M.
6 Vp-p, 25 Hz
TP18 (P.B)
PHASE M.M.
6 Vp-p, 25 Hz
TP20 (REC, P.B)
PHASE ERROR
5.2 Vp-p
TP23 (REC, P.B)
CAP. ERROR
5.8 Vp-p
TP16 (REC, P.B)
RESET PULSE
0.44 Vp-p
TP17 (REC, P.B)
CAP. REC PHASE
11 Vp-p, 25 Hz
T : 10 msec
IC14-11 (REC, P.B)
COUNT DOWN
12 Vp-p, 25 Hz
TP24 (REC, P.B)
CTL. VOLTAGE
3 Vp-p
TP21 (REC, P.B)
DISCRIM. ERROR
5.2 Vp-p
IC17-3 (REC, P.B)
DISCRIM MM
4 Vp-p
IC17-4 (REC, P.B)
TRAPEZOID
5.4 Vp-p
IC17-5 (REC, P.B)
DISCRIM. GATE
3.4 Vp-p
TP25 (REC, P.B)
DRUM F.F
9 Vp-p, 25 Hz
IC1 LM2907N-8
IC2 μPC1458C
IC3 HA17555PS
Q6 2SC1545B
IC4 μPC1458C
IC22 TA78L010AP
IC5 AN360
IC6 UPC1458C
IC7 TC4027BP
IC8 HA17555PS
IC9 TC4011BP
IC10 TC4069UBP
IC20 TC4066BP
IC21 NJM2903D
IC14 TC4017BP
IC15 TC4011BP
IC16 HA17555PS
IC17 AN6341N
Q19 2SC1545B
CHARGE PUMP
AMP
TRIGGER
MMV
RESET
REG
COUNT DOWN
X5 DRUM SEARCH
REV X5 DRUM SEARCH
DC SET 1
DC SET 2
DC SET 3
CAP. FG 450Hz
FROM CAP. MOTOR
P301
CONTROL HEAD
P304
20 HEAD SW TO CF SERVO P221-3
P305
CTL REC IN
GND
DRUM SERVO
P327
P306
H: HEAD SW IN
H: REC MODE IN
H: X1/6 SPEED IN
H: X2 SPEED IN
H: SEARCH SPEED IN
H: CAP. REVERSE IN
H: CAP. MOTOR IN
H: SERVO REC IN
H: CAP. SEARCH IN
GND
P510
SYSTEM CONTROL
H: STOP TALLY IN
CAP MOT.
CAP. SEARCH
TO CF SERVO P221
DRIVER
P322
12V IN
24V IN
REC SERVO 24V IN
GND
P308
H: CAP. REVERSE OUT
12V OUT
H: BRAKE OUT
CTL VOLTAGE OUT
CAPSTAN MOTOR
CAP FG 450Hz
CAP FG
TO CAPSTAN P301
P307
Q1005 2SD389A0
12V
GND
TO CF SERVO
CAPSTAN
Q23 2SB793AR
Q21 2SD639R
Q22 2SD973AR
Q24 2SD389A0
MA26W
SUB TRACKIG
STILL WIDTH
CAP. REC PHASE-1
CAP. REC PHASE-2
F/G AMP
PG AMP
MMV-1
MMV-2
GATE
TRAPEZOID
SAMPLE & HOLD
FF-1
FF-2
FF-3
INV
DIF
DISCRIM
P302
CAP. FG (450Hz) OUT
GND
CAP. PULSE (25Hz) OUT
CTL. PULSE (25Hz) OUT
P502
SYSTEM CONTROL
P303
500K
TRACKING VR
CTL. PULSE (25Hz)
CF ERROR SW
ERROR
TO CF SERVO P222 P223
H: CAP. MOTOR OUT
H: CAP. LOCK OUT
DRUM TRAPE. IN
H: SEARCH VOLT OUT
DRUM FLIPFLOP IN
P329
DRUM SERVO

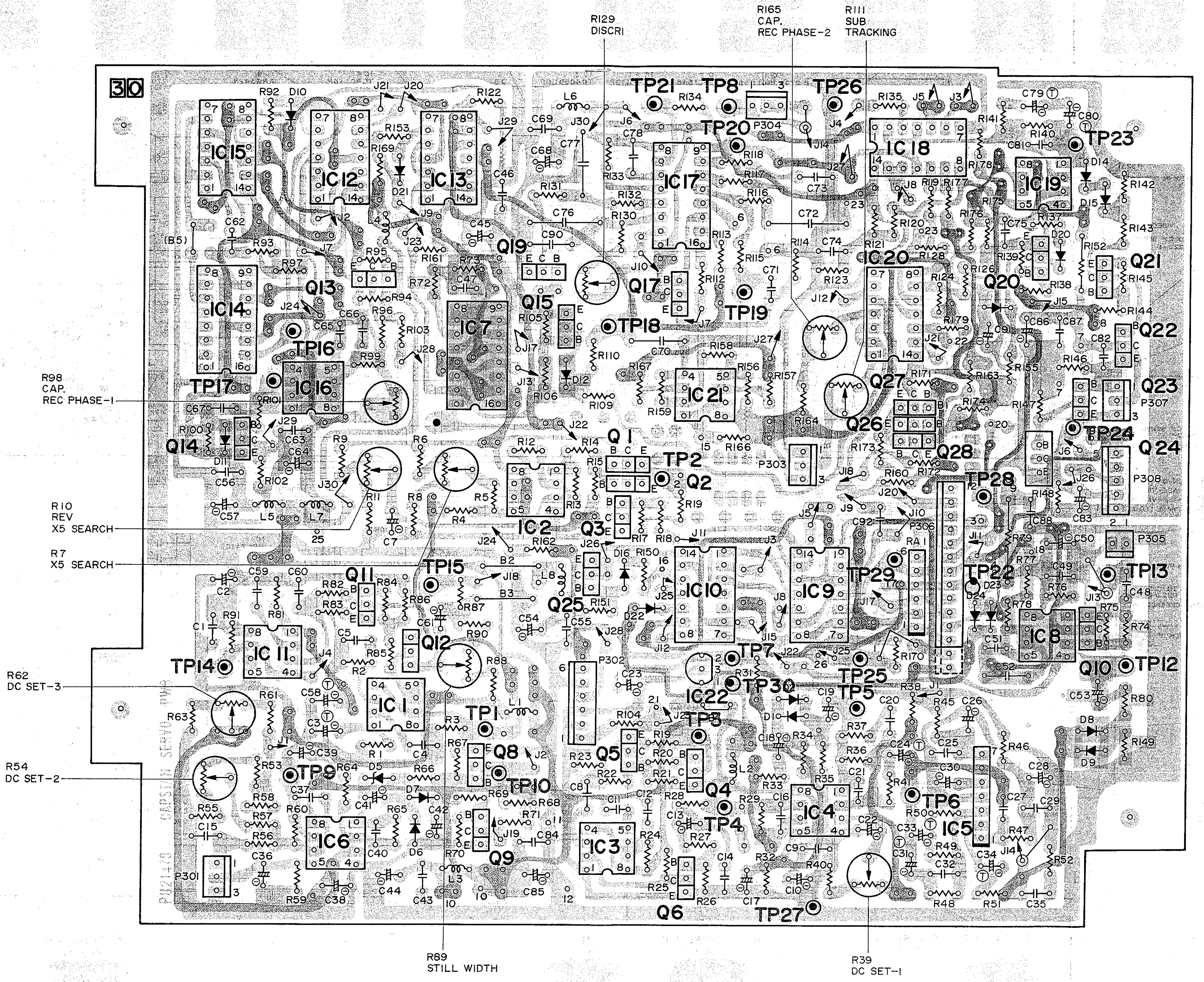
NOTE
UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SD636Q
ALL PNP TRANSISTORS ARE 2SB641Q
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF
ELECTROLYTIC 16V
TANTALUM 16V
MYLAR OR CERAMIC OR POLYPROPYLENE

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ). parts are critical for safety. Replace only with specified part numbers.

NO.	NAME	NO.	NAME
IC 1	LM2907N-8	IC 12	TC4069UBP
IC 2	μPC1458C	IC 13	TC4011BP
IC 3	HA17555PS	IC 14	TC4017BP
IC 4	μPC1458C	IC 15	TC4011BP
IC 5	AN360	IC 16	HA17555PS
IC 6	μPC1458	IC 17	AN6341N
IC 7	TC4027BP	IC 18	TC4066BP
IC 8	HA17555PS	IC 19	μPC1458C
IC 9	TC4011BP	IC 20	TC4066BP
IC 10	TC6911BP	IC 21	NJM2903D
IC 11	LM2907N-8	IC 22	TA78L010AP

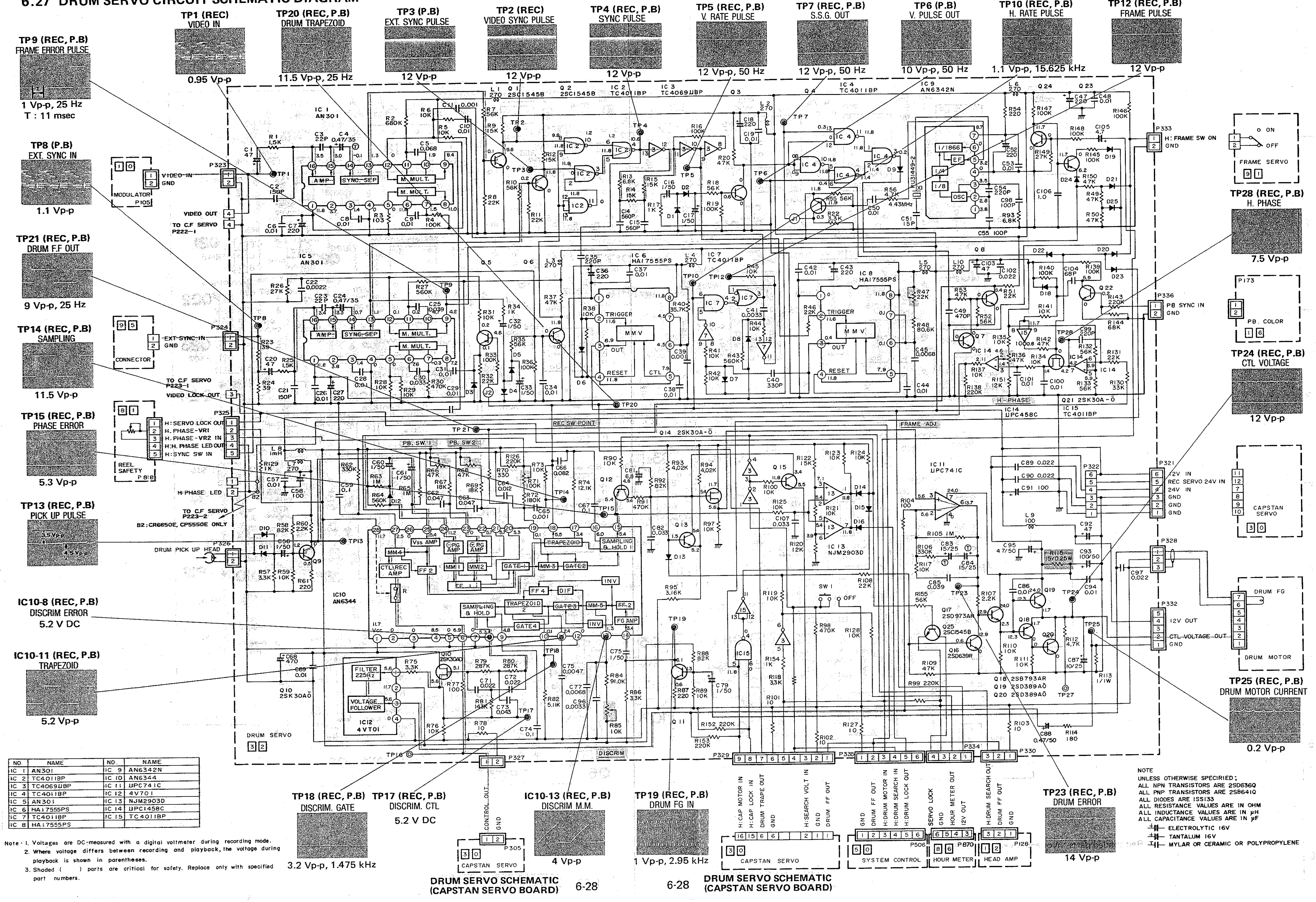
Red shaded parts : Not employed in CP-5550E.

6.26 CAPSTAN SERVO CIRCUIT BOARD


R129
DISCRI
R165
CAP.
REC PHASE-2
R111
SUB
TRACKING
R98
CAP.
REC PHASE-1
R10
REV
X5 SEARCH
R7
X5 SEARCH
R62
DC SET-3
R54
DC SET-2
R89
STILL WIDTH
R39
DC SET-1
30

Red shaded parts : Not employed in CP-5550E.

6.27 DRUM SERVO CIRCUIT SCHEMATIC DIAGRAM


TP9 (REC, P.B)
FRAME ERROR PULSE
1 Vp-p, 25 Hz
T : 11 msec
TP1 (REC)
VIDEO IN
0.95 Vp-p
TP20 (REC, P.B)
DRUM TRAPEZOID
11.5 Vp-p, 25 Hz
TP3 (P.B)
EXT. SYNC PULSE
12 Vp-p
TP2 (REC)
VIDEO SYNC PULSE
12 Vp-p
TP4 (REC, P.B)
SYNC PULSE
12 Vp-p
TP5 (REC, P.B)
V. RATE PULSE
12 Vp-p, 50 Hz
TP7 (REC, P.B)
S.S.G. OUT
12 Vp-p, 50 Hz
TP6 (P.B)
V. PULSE OUT
10 Vp-p, 50 Hz
TP10 (REC, P.B)
H. RATE PULSE
1.1 Vp-p, 15.625 kHz
TP12 (REC, P.B)
FRAME PULSE
12 Vp-p
TP8 (P.B)
EXT. SYNC IN
1.1 Vp-p
TP21 (REC, P.B)
DRUM F.F OUT
9 Vp-p, 25 Hz
TP14 (REC, P.B)
SAMPLING
11.5 Vp-p
TP15 (REC, P.B)
PHASE ERROR
5.3 Vp-p
TP13 (REC, P.B)
PICK UP PULSE
3.5 Vp-p
4.5 Vp-p
IC10-8 (REC, P.B)
DISCRIM ERROR
5.2 V DC
IC10-11 (REC, P.B)
TRAPEZOID
5.2 Vp-p
TP18 (REC, P.B)
DISCRIM. GATE
3.2 Vp-p, 1.475 kHz
TP17 (REC, P.B)
DISCRIM. CTL
5.2 V DC
IC10-13 (REC, P.B)
DISCRIM M.M.
4 Vp-p
TP19 (REC, P.B)
DRUM FG IN
1 Vp-p, 2.95 kHz
TP23 (REC, P.B)
DRUM ERROR
14 Vp-p
TP25 (REC, P.B)
DRUM MOTOR CURRENT
0.2 Vp-p
TP24 (REC, P.B)
CTL VOLTAGE
12 Vp-p
TP28 (REC, P.B)
H. PHASE
7.5 Vp-p
MODULATOR P105
VIDEO IN
GND
VIDEO OUT
TO C.F SERVO P222-1
CONNECTOR
EXT-SYNC-IN
GND
TO C.F SERVO P223-1
VIDEO LOCK OUT
REEL SAFETY P818
H: SERVO LOCK OUT
H. PHASE-VR1
H. PHASE-VR2 IN
H:H. PHASE LED OUT
H: SYNC SW IN
H:PHASE LED
TO C.F SERVO P223-2
B2: CR6650E, CP5550E ONLY
DRUM PICK UP HEAD
DRUM SERVO 3 2
IC1 AN301
IC2 TC4011BP
IC3 TC4069UBP
IC4 TC4011BP
IC5 AN301
IC6 HA17555PS
IC7 TC4011BP
IC8 HA17555PS
IC9 AN6342N
IC10 AN6344
IC11 UPC741C
IC12 4V701
IC13 NJM2903D
IC14 UPC458C
IC15 TC4011BP
AMP
SYNC SEP
M. MULT.
TRIGGER
MMV
OUT
RESET
CTL
4.43MHz
OSC
FILTER 225Hz
VOLTAGE FOLLOWER
MM4
CTL/REC AMP
Vss AMP
C.PG AMP
C.PG AMP
FF 2
MM1
MM2
FF 1
GATE-1
MM-3
GATE2
TRAPEZOID
SAMPLING & HOLD I
FF 4
DIF
INV
SAMPLING & HOLD
TRAPEZOID
GATE3
MM-5
FF-2
GATE4
INV
FG AMP
PB. SW. 1
PB. SW. 2
REC SW POINT
FRAME ADJ.
H. PHASE
DISCRIM
SW 1
OFF
P333
H: FRAME SW ON
GND
FRAME SERVO 9 1
ON
OFF
P336
PB SYNC IN
GND
P173
PB. COLOR 1 6
P321
12V IN
REC SERVO 24V IN
24V IN
GND
GND
GND
CAPSTAN SERVO 3 0
P322
P328
DRUM FG
P332
12V OUT
CTL VOLTAGE OUT
GND
DRUM MOTOR
P329
P335
P334
P330
P327
CONTROL OUT
GND
P305
CAPSTAN SERVO 3 0
H:CAP MOTOR IN
H:CAP LOCK IN
DRUM TRAPE OUT
GND
H:SEARCH VOLT IN
GND
DRUM FF OUT
CAPSTAN SERVO 3 0
GND
DRUM FF OUT
H:DRUM MOTOR IN
H:DRUM SEARCH IN
H:DRUM LOCK OUT
SYSTEM CONTROL 5 0
P506
SERVO LOCK
GND
HOUR METER OUT
12V OUT
HOUR METER
P870
H:DRUM SEARCH OUT
DRUM FG OUT
GND
HEAD AMP
P128

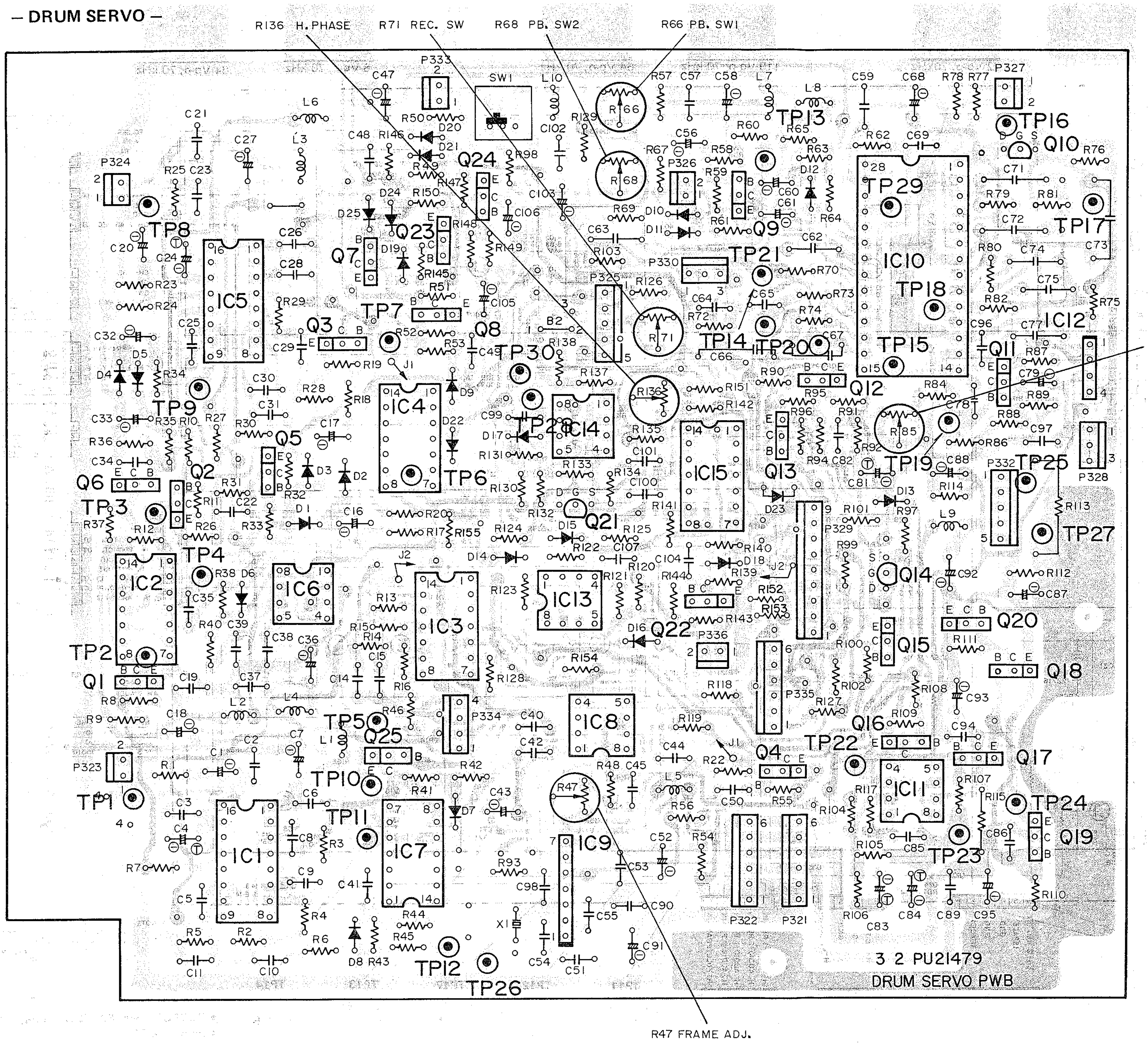
NO.	NAME	NO.	NAME
IC 1	AN301	IC 9	AN6342N
IC 2	TC4011BP	IC 10	AN6344
IC 3	TC4069UBP	IC 11	UPC741C
IC 4	TC4011BP	IC 12	4V701
IC 5	AN301	IC 13	NJM2903D
IC 6	HA17555PS	IC 14	UPC1458C
IC 7	TC4011BP	IC 15	TC4011BP
IC 8	HA17555PS		

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded (   ) parts are critical for safety. Replace only with specified part numbers.

NOTE
UNLESS OTHERWISE SPECIRIED;
ALL NPN TRANSISTORS ARE 2SD636Q
ALL PNP TRANSISTORS ARE 2SB641Q
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF
ELECTROLYTIC 16V
TANTALUM 16V
MYLAR OR CERAMIC OR POLYPROPYLENE

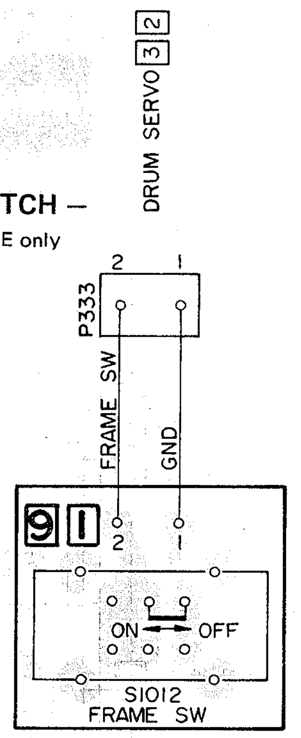
6.28 DRUM SERVO AND FRAME SWITCH CIRCUIT BOARD

– DRUM SERVO –


R136 H.PHASE
R71 REC. SW
R68 PB. SW2
R66 PB. SW1
R85 DISCRIM.
R47 FRAME ADJ.
3 2 PU21479
DRUM SERVO PWB

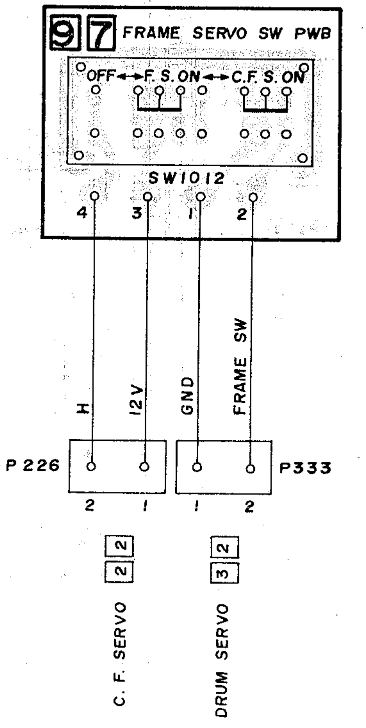
– FRAME SWITCH –

CR-6650E, CP-5550E only


DRUM SERVO 3 2
P333
FRAME SW
GND
9 1
ON
OFF
S1012
FRAME SW

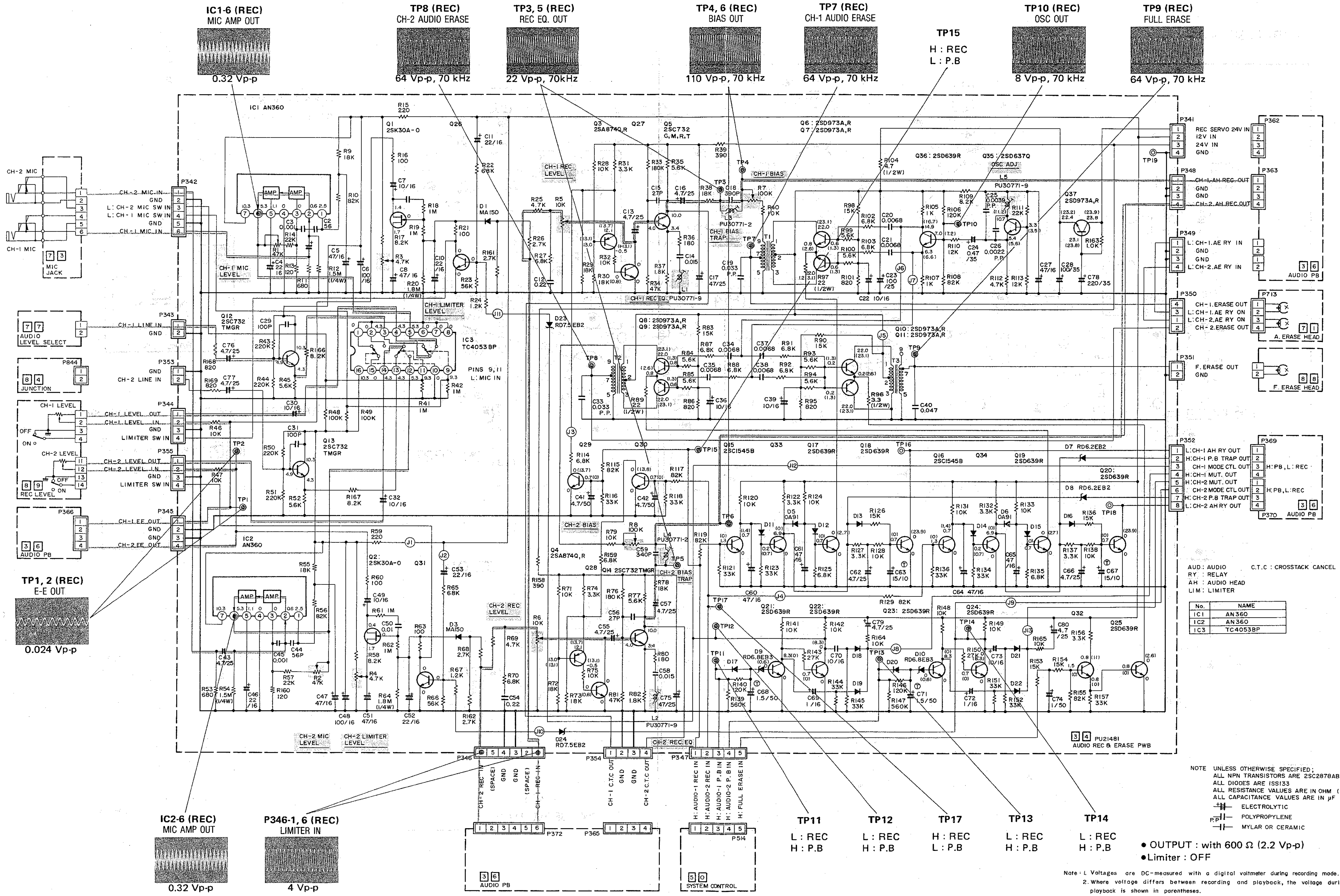
– FRAME SERVO SWITCH –

CR-8250E only


9 7 FRAME SERVO SW PWB
OFF F.S.ON C.F.S.ON
SW1012
H
12V
GND
FRAME SW
P226
P333
C. F. SERVO 2 2
DRUM SERVO 3 2

F.S. ON FRAME SW ON
C.F.S. ON COLOR FRAME SW ON

6.29 AUDIO REC CIRCUIT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
IC1-6 (REC)
MIC AMP OUT
0.32 Vp-p
TP8 (REC)
CH-2 AUDIO ERASE
64 Vp-p, 70 kHz
TP3, 5 (REC)
REC EQ. OUT
22 Vp-p, 70kHz
TP4, 6 (REC)
BIAS OUT
110 Vp-p, 70 kHz
TP7 (REC)
CH-1 AUDIO ERASE
64 Vp-p, 70 kHz
TP15
H : REC
L : P.B
TP10 (REC)
OSC OUT
8 Vp-p, 70 kHz
TP9 (REC)
FULL ERASE
64 Vp-p, 70 kHz
IC1 AN360
IC2 AN360
IC3 TC4053BP
PINS 9, 11 L: MIC IN
Q1 2SK30A-O
Q2 2SK30A-O
Q3 2SA874Q,R
Q4 2SA874Q,R
Q5 2SC732 G,M,R,T
Q6 : 2SD973A,R
Q7 : 2SD973A,R
Q8: 2SD973A,R
Q9: 2SD973A,R
Q10: 2SD973A,R
Q11: 2SD973A,R
Q12 2SC732 TMGR
Q13 2SC732 TMGR
Q14 2SC732TMGR
Q15 2SC1545B
Q16 2SC1545B
Q17 2SD639R
Q18 2SD639R
Q19 2SD639R
Q20: 2SD639R
Q21: 2SD639R
Q22: 2SD639R
Q23: 2SD639R
Q24: 2SD639R
Q25 2SD639R
Q35 : 2SD637Q OSC ADJ
Q36 : 2SD639R
Q37 2SD973A,R
D1 MA150
D3 MA150
D7 RD6.2EB2
D8 RD6.2EB2
D9 RD6.8EB3
D10 RD6.8EB3
D23 RD7.5EB2
D24 RD7.5EB2
L1
L2 PU30771-9
L3 PU30771-2
L4 PU30771-2
L5 PU30771-9
T1
T2
T3
CH-1 REC LEVEL
CH-1 MIC LEVEL
CH-1 LIMITER LEVEL
CH-1 REC EQ. PU30771-9
CH-1 BIAS
CH-1 BIAS TRAP
CH-2 REC LEVEL
CH-2 MIC LEVEL
CH-2 LIMITER LEVEL
CH-2 BIAS
CH-2 BIAS TRAP
CH-2 REC EQ
CH-2 MIC
CH-1 MIC
MIC JACK
P342
CH-2 MIC IN
GND
L: CH-2 MIC SW IN
L: CH-1 MIC SW IN
GND
CH-1 MIC IN
P343
CH-1 LINE IN
GND
AUDIO LEVEL SELECT
P844
P353
GND
CH-2 LINE IN
JUNCTION
P344
CH-1 LEVEL
CH-1 LEVEL OUT
CH-1 LEVEL IN
GND
LIMITER SW IN
OFF
ON
P355
CH-2 LEVEL
CH-2 LEVEL OUT
CH-2 LEVEL IN
GND
LIMITER SW IN
REC LEVEL
P366
P345
CH-1 EE OUT
GND
GND
CH-2 EE OUT
AUDIO PB
TP1
TP2
TP1, 2 (REC)
E-E OUT
0.024 Vp-p
P341
REC SERVO 24V IN
12V IN
24V IN
GND
TP19
P362
P348
CH-1 AH REC OUT
GND
GND
CH-2 AH REC OUT
P363
P349
L: CH-1 AE RY IN
GND
GND
L: CH-2 AE RY IN
P350
CH-1 ERASE OUT
L: CH-1 AE RY ON
L: CH-2 AE RY ON
CH-2 ERASE OUT
P713
A. ERASE HEAD
P351
F. ERASE OUT
GND
F. ERASE HEAD
P352
L: CH-1 AH RY OUT
H: CH-1 P.B TRAP OUT
CH-1 MODE CTL OUT
H: CH-1 MUT. OUT
H: CH-2 MUT. OUT
CH-2 MODE CTL OUT
H: CH-2 P.B TRAP OUT
L: CH-2 AH RY OUT
P369
H: PB, L: REC
H: PB, L: REC
P370
AUDIO PB
PU21481
AUDIO REC & ERASE PWB
P346
CH-2 REC IN
(SPACE)
GND
GND
(SPACE)
CH-1 REC IN
P354
CH-1 C.T.C OUT
GND
GND
CH-2 C.T.C OUT
P347
H: AUDIO-1 REC IN
H: AUDIO-2 REC IN
H: AUDIO-1 P.B IN
H: AUDIO-2 P.B IN
H: FULL ERASE IN
P372
P365
AUDIO PB
P514
SYSTEM CONTROL
IC2-6 (REC)
MIC AMP OUT
0.32 Vp-p
P346-1, 6 (REC)
LIMITER IN
4 Vp-p
TP11
L : REC
H : P.B
TP12
L : REC
H : P.B
TP17
H : REC
L : P.B
TP13
L : REC
H : P.B
TP14
L : REC
H : P.B

AUD : AUDIO
RY : RELAY
AH : AUDIO HEAD
LIM : LIMITER

C.T.C : CROSSTACK CANCEL

No.	NAME
IC1	AN360
IC2	AN360
IC3	TC4053BP

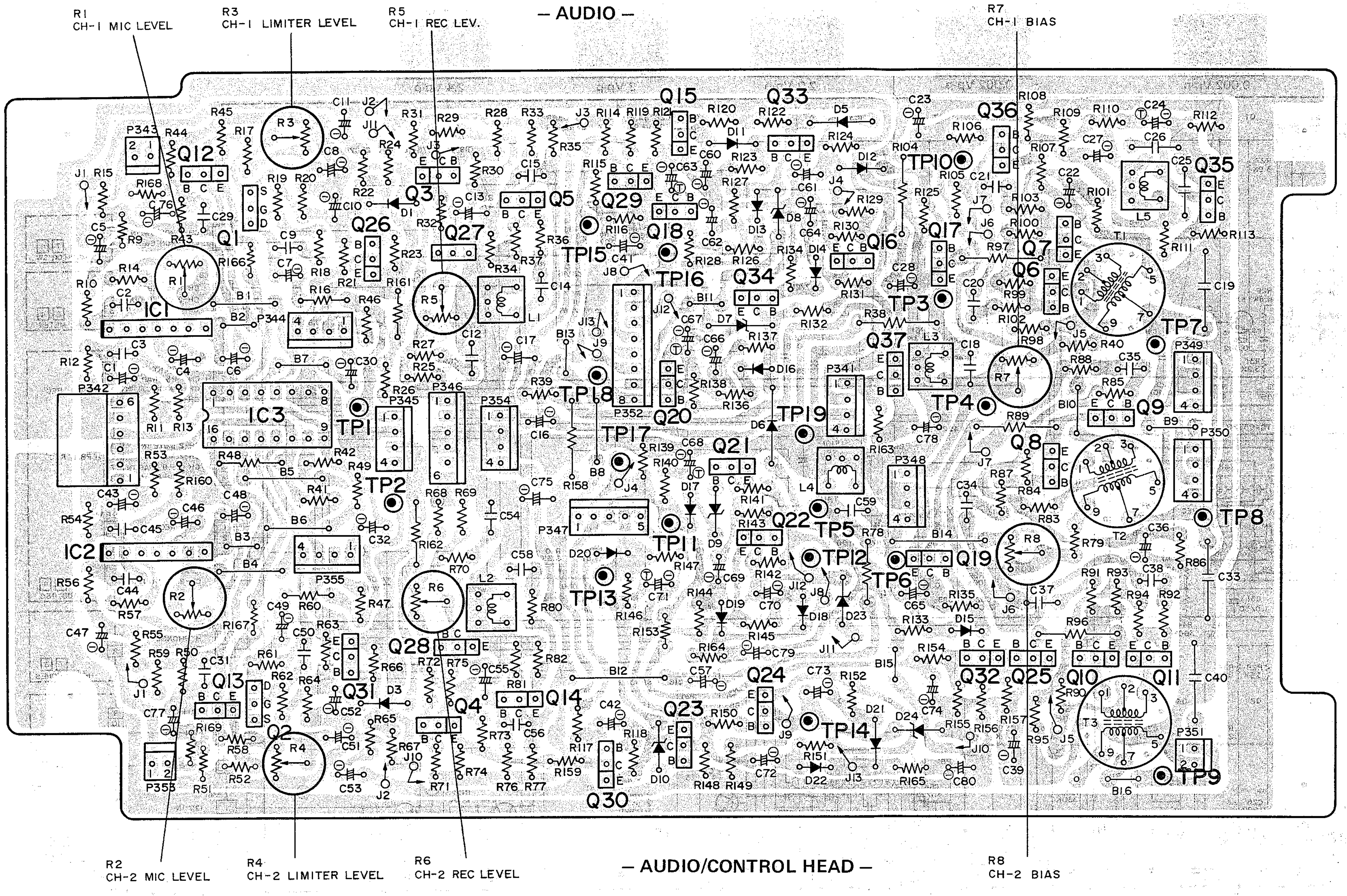
NOTE UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC2878AB
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W)
ALL CAPACITANCE VALUES ARE IN μF
ELECTROLYTIC
P.P POLYPROPYLENE
MYLAR OR CERAMIC

- OUTPUT : with 600 Ω (2.2 Vp-p)
- Limiter : OFF

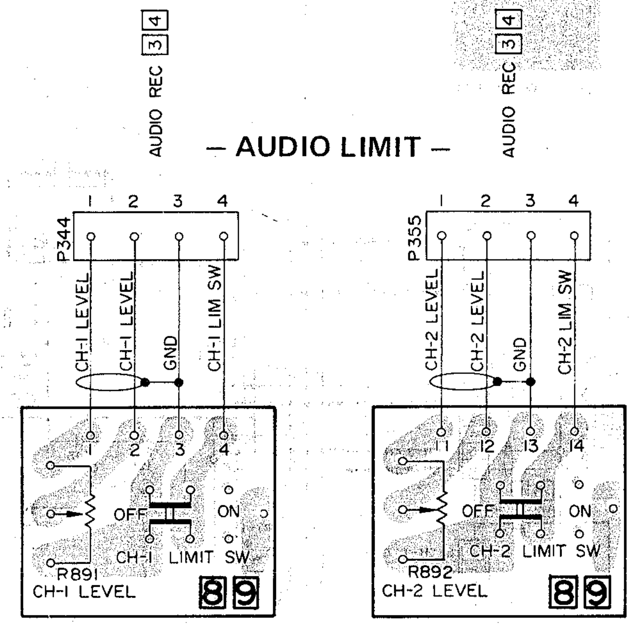
Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

A B C D E F G H

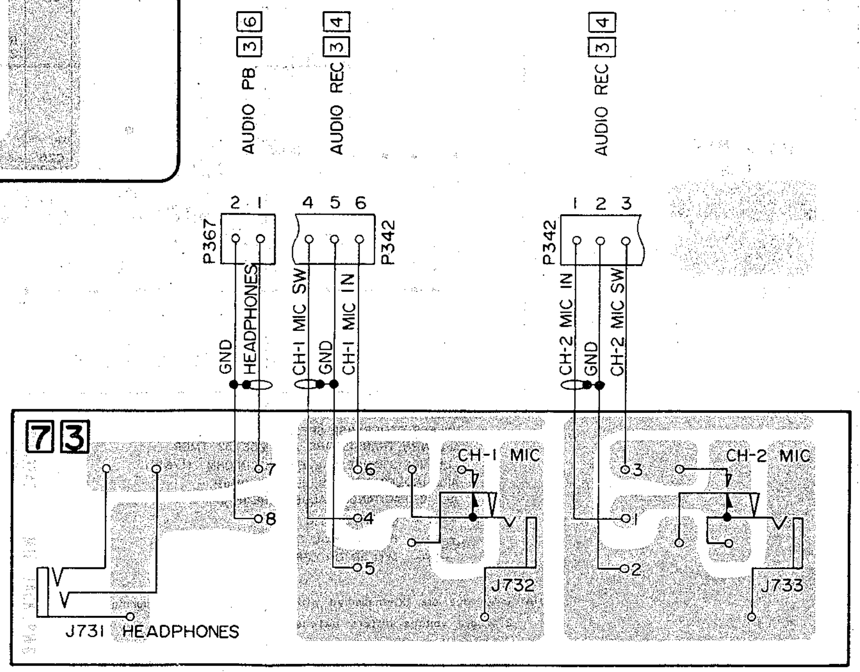
6.30 AUDIO REC, MIC JACK, AUDIO/CONTROL HEAD AND AUDIO LIMIT SWITCH CIRCUIT BOARD


– AUDIO –
R1
CH-1 MIC LEVEL
R3
CH-1 LIMITER LEVEL
R5
CH-1 REC LEV.
R7
CH-1 BIAS
R2
CH-2 MIC LEVEL
R4
CH-2 LIMITER LEVEL
R6
CH-2 REC LEVEL
R8
CH-2 BIAS
IC1
IC2
IC3
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
P342
P343
P344
P345
P346
P347
P348
P349
P350
P351
P352
P353
P354
P355
P341
L1
L2
L3
L4
L5
T1
T2
T3

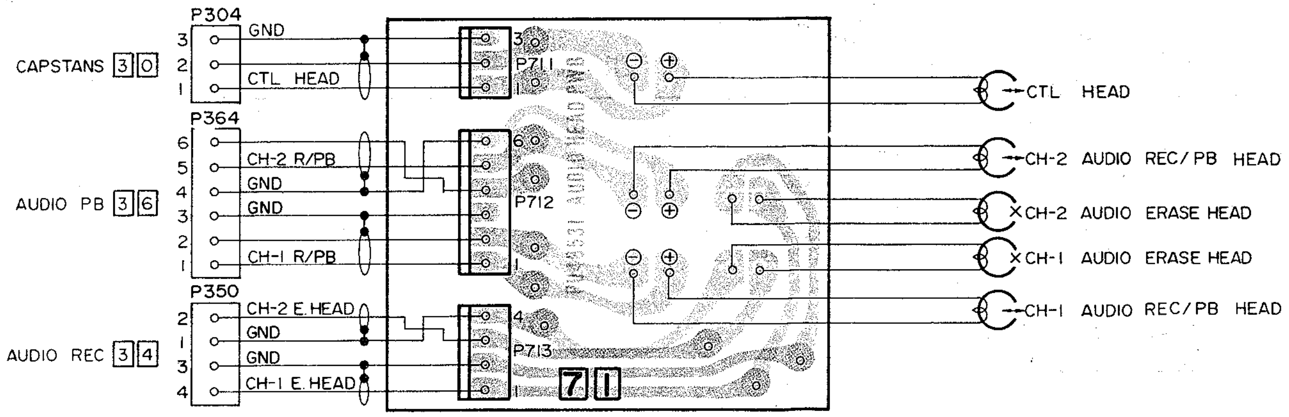
– AUDIO LIMIT –


AUDIO REC 3 4
P344
CH-1 LEVEL
CH-1 LEVEL
GND
CH-1 LIM SW
OFF
ON
CH-1 LIMIT SW
R891
CH-1 LEVEL
89
P355
CH-2 LEVEL
CH-2 LEVEL
GND
CH-2 LIM SW
CH-2 LIMIT SW
R892
CH-2 LEVEL

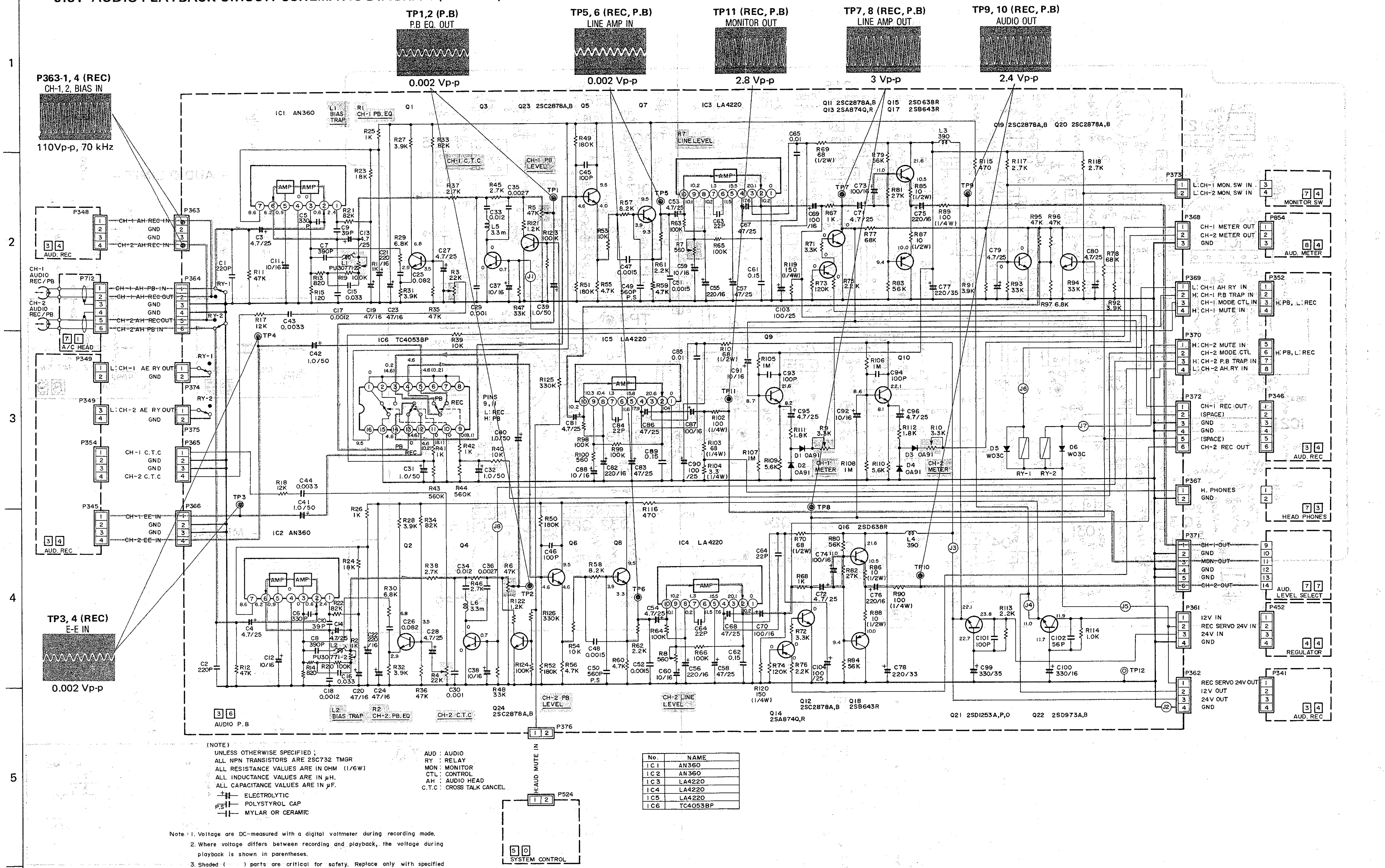
– MIC JACK –


AUDIO PB 3 6
AUDIO REC 3 4
AUDIO REC 3 4
P367
P342
P342
GND
HEADPHONES
CH-1 MIC SW
GND
CH-1 MIC IN
CH-2 MIC IN
GND
CH-2 MIC SW
73
CH-1 MIC
CH-2 MIC
J731 HEADPHONES
J732
J733

– AUDIO/CONTROL HEAD –


CAPSTANS 3 0
P304
GND
CTL HEAD
AUDIO PB 3 6
P364
CH-2 R/PB
GND
GND
CH-1 R/PB
AUDIO REC 3 4
P350
CH-2 E. HEAD
GND
GND
CH-1 E. HEAD
P711
P712
P713
71
CTL HEAD
CH-2 AUDIO REC/PB HEAD
CH-2 AUDIO ERASE HEAD
CH-1 AUDIO ERASE HEAD
CH-1 AUDIO REC/PB HEAD

6.31 AUDIO PLAYBACK CIRCUIT SCHEMATIC DIAGRAM (Recorder)


TP1,2 (P.B)
P.B EQ. OUT
0.002 Vp-p
TP5, 6 (REC, P.B)
LINE AMP IN
0.002 Vp-p
TP11 (REC, P.B)
MONITOR OUT
2.8 Vp-p
TP7, 8 (REC, P.B)
LINE AMP OUT
3 Vp-p
TP9, 10 (REC, P.B)
AUDIO OUT
2.4 Vp-p
P363-1, 4 (REC)
CH-1, 2, BIAS IN
110Vp-p, 70 kHz
TP3, 4 (REC)
E-E IN
0.002 Vp-p
IC1 AN360
IC2 AN360
IC3 LA4220
IC4 LA4220
IC5 LA4220
IC6 TC4053BP
L1 BIAS TRAP
R1 CH-1 PB.EQ
L2 BIAS TRAP
R2 CH-2 PB.EQ
CH-1 C.T.C
CH-2 C.T.C
CH-1 PB LEVEL
CH-2 PB LEVEL
R7 LINE LEVEL
CH-2 LINE LEVEL
CH-1 METER
CH-2 METER
Q23 2SC2878A,B
Q24 2SC2878A,B
Q11 2SC2878A,B
Q13 2SA874Q,R
Q15 2SD638R
Q17 2SB643R
Q19 2SC2878A,B
Q20 2SC2878A,B
Q12 2SC2878A,B
Q14 2SA874Q,R
Q16 2SD638R
Q18 2SB643R
Q21 2SD1253A,P,O
Q22 2SD973A,B
P348
CH-1 AH REC IN
GND
CH-2 AH REC IN
3 4 AUD. REC
P712
CH-1 AUDIO REC/PB
CH-2 AUDIO REC/PB
CH-1 AH PB IN
CH-1 AH REC OUT
CH-2 AH REC OUT
CH-2 AH PB IN
7 1 A/C HEAD
P349
L: CH-1 AE RY OUT
L: CH-2 AE RY OUT
RY-1
RY-2
P354
CH-1 C.T.C
CH-2 C.T.C
P345
CH-1 EE IN
CH-2 EE IN
3 4 AUD. REC
P363
P364
P374
P375
P365
P366
P373
L: CH-1 MON. SW IN
L: CH-2 MON. SW IN
7 4 MONITOR SW
P368
CH-1 METER OUT
CH-2 METER OUT
GND
P854
8 4 AUD. METER
P369
L: CH-1 AH RY IN
H: CH-1 P.B TRAP IN
H: CH-1 MODE CTL IN
H: CH-1 MUTE IN
P352
H: PB, L: REC
P370
H: CH-2 MUTE IN
H: CH-2 MODE CTL
H: CH-2 P.B TRAP IN
L: CH-2 AH.RY IN
H: PB, L: REC
P372
CH-1 REC OUT
(SPACE)
CH-2 REC OUT
P346
3 4 AUD. REC
P367
H. PHONES
7 3 HEAD PHONES
P371
CH-1 OUT
MON. OUT
CH-2 OUT
AUD. LEVEL SELECT 7 7
P361
12V IN
REC SERVO 24V IN
24V IN
P452
4 4 REGULATOR
P362
REC SERVO 24V OUT
12V OUT
24V OUT
P341
3 4 AUD. REC
3 6 AUDIO P.B
P376
H: AUD MUTE IN
P524
5 0 SYSTEM CONTROL
PINS 9, 11
L: REC
H: PB
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
J1
J2
J3
J4
J5
J6
J7
J8
D1 OA91
D2 OA91
D3 OA91
D4 OA91
D5 W03C
D6 W03C
L3 390
L4 390

(NOTE)

UNLESS OTHERWISE SPECIFIED ;
ALL NPN TRANSISTORS ARE 2SC732 TMGR
ALL RESISTANCE VALUES ARE IN OHM (1/6W)
ALL INDUCTANCE VALUES ARE IN μH.
ALL CAPACITANCE VALUES ARE IN μF.

+|| ELECTROLYTIC
P.S || POLYSTYROL CAP
|| MYLAR OR CERAMIC

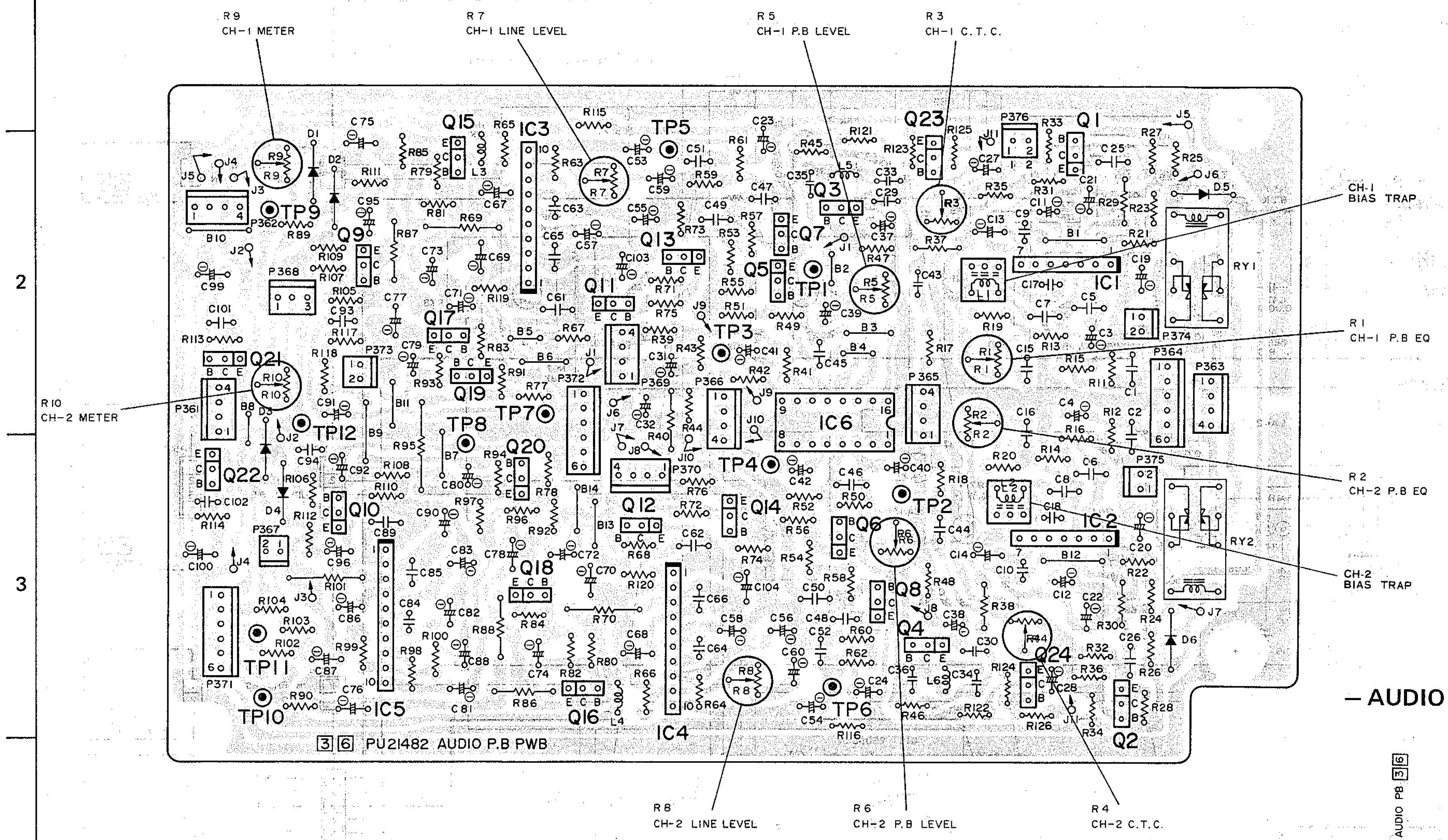
AUD : AUDIO
RY : RELAY
MON : MONITOR
CTL : CONTROL
AH : AUDIO HEAD
C.T.C : CROSS TALK CANCEL

No.	NAME
IC1	AN360
IC2	AN360
IC3	LA4220
IC4	LA4220
IC5	LA4220
IC6	TC4053BP

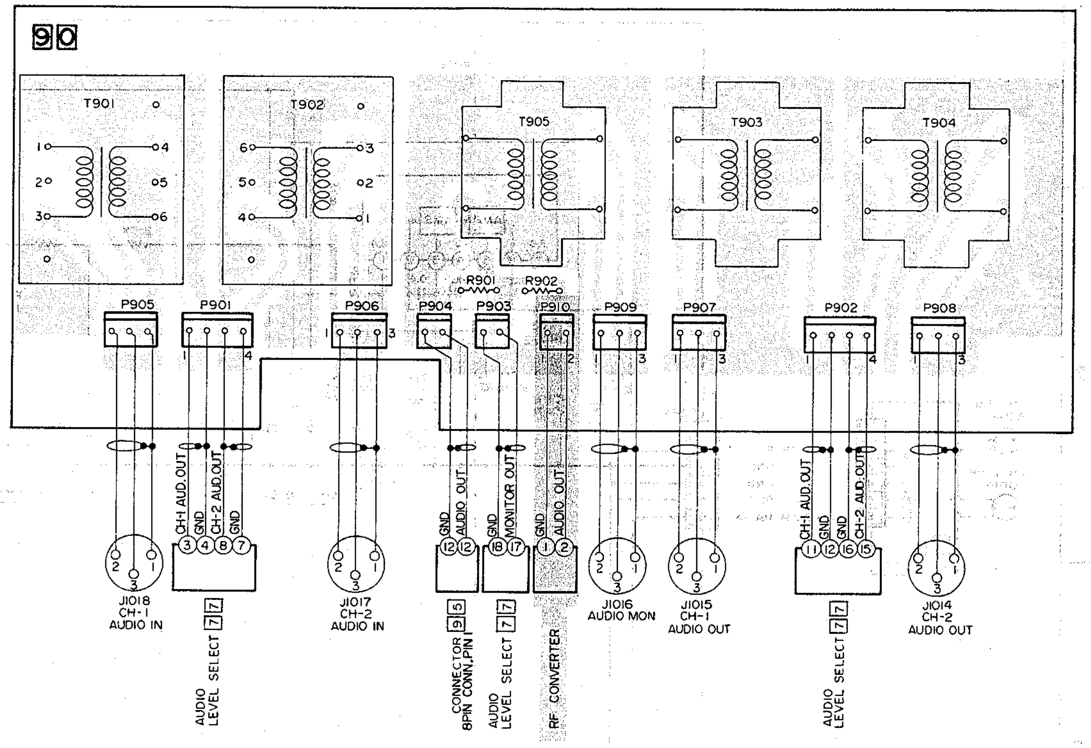
Note : 1. Voltage are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6.32 AUDIO PLAYBACK, AUDIO LEVEL SELECT AND AUDIO TRANS CIRCUIT BOARD (Recorder)

– AUDIO –

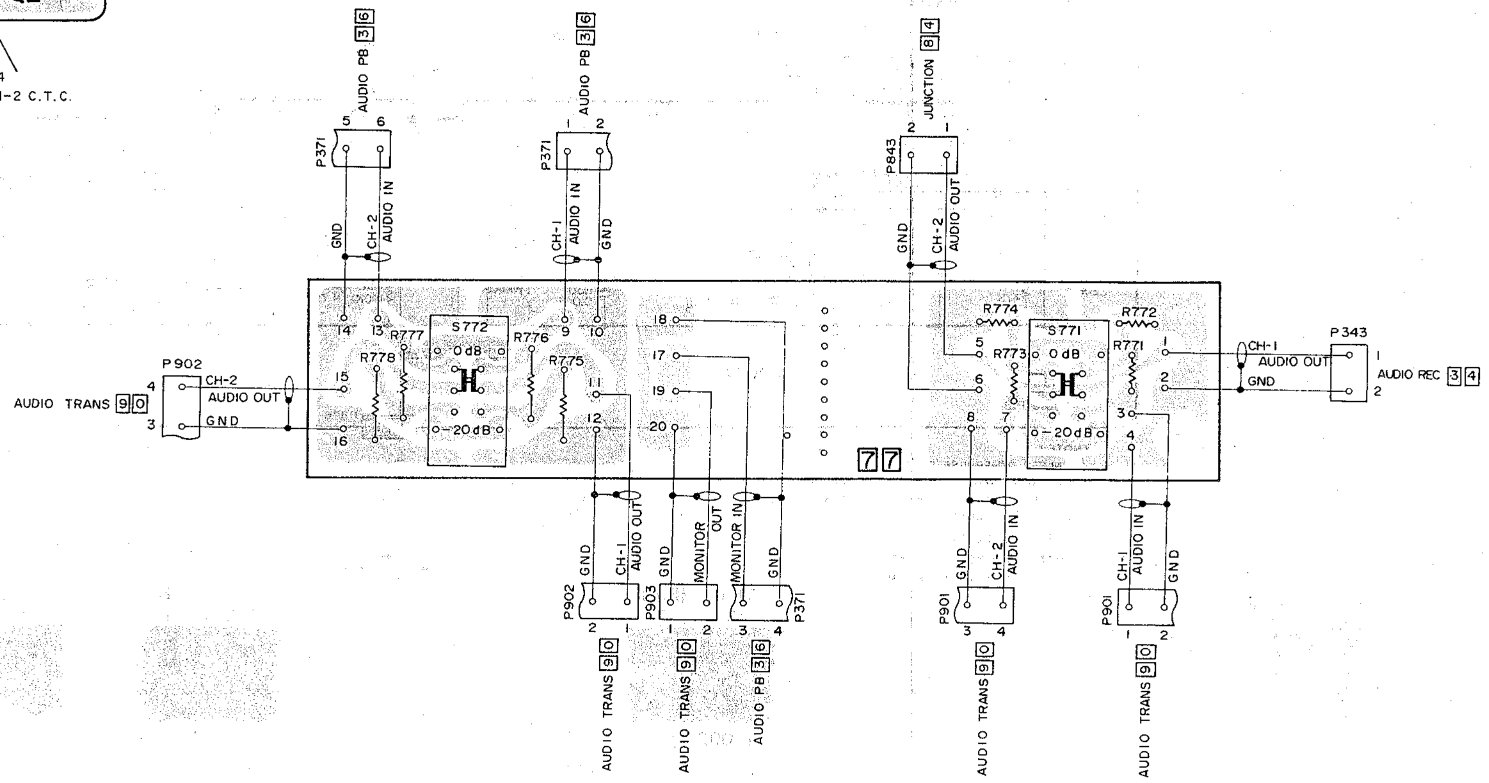

R9
CH-1 METER
R7
CH-1 LINE LEVEL
R5
CH-1 P.B LEVEL
R3
CH-1 C.T.C.
CH-1
BIAS TRAP
R1
CH-1 P.B EQ
R10
CH-2 METER
R2
CH-2 P.B EQ
CH-2
BIAS TRAP
R8
CH-2 LINE LEVEL
R6
CH-2 P.B LEVEL
R4
CH-2 C.T.C.
IC1
IC2
IC3
IC4
IC5
IC6
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
RY1
RY2
36 PU21482 AUDIO P.B PWB

– AUDIO TRANS –


90
T901
T902
T905
T903
T904
P905
P901
P906
P904
P903
P910
P909
P907
P902
P908
R901
R902
CH-1 AUD.OUT
GND
CH-2 AUD.OUT
GND
AUDIO OUT
MONITOR OUT
J1018
CH-1
AUDIO IN
AUDIO LEVEL SELECT 77
J1017
CH-2
AUDIO IN
CONNECTOR 95
8PIN CONN.PIN
AUDIO LEVEL SELECT 77
RF CONVERTER
J1016
AUDIO MON
J1015
CH-1
AUDIO OUT
AUDIO LEVEL SELECT 77
J1014
CH-2
AUDIO OUT

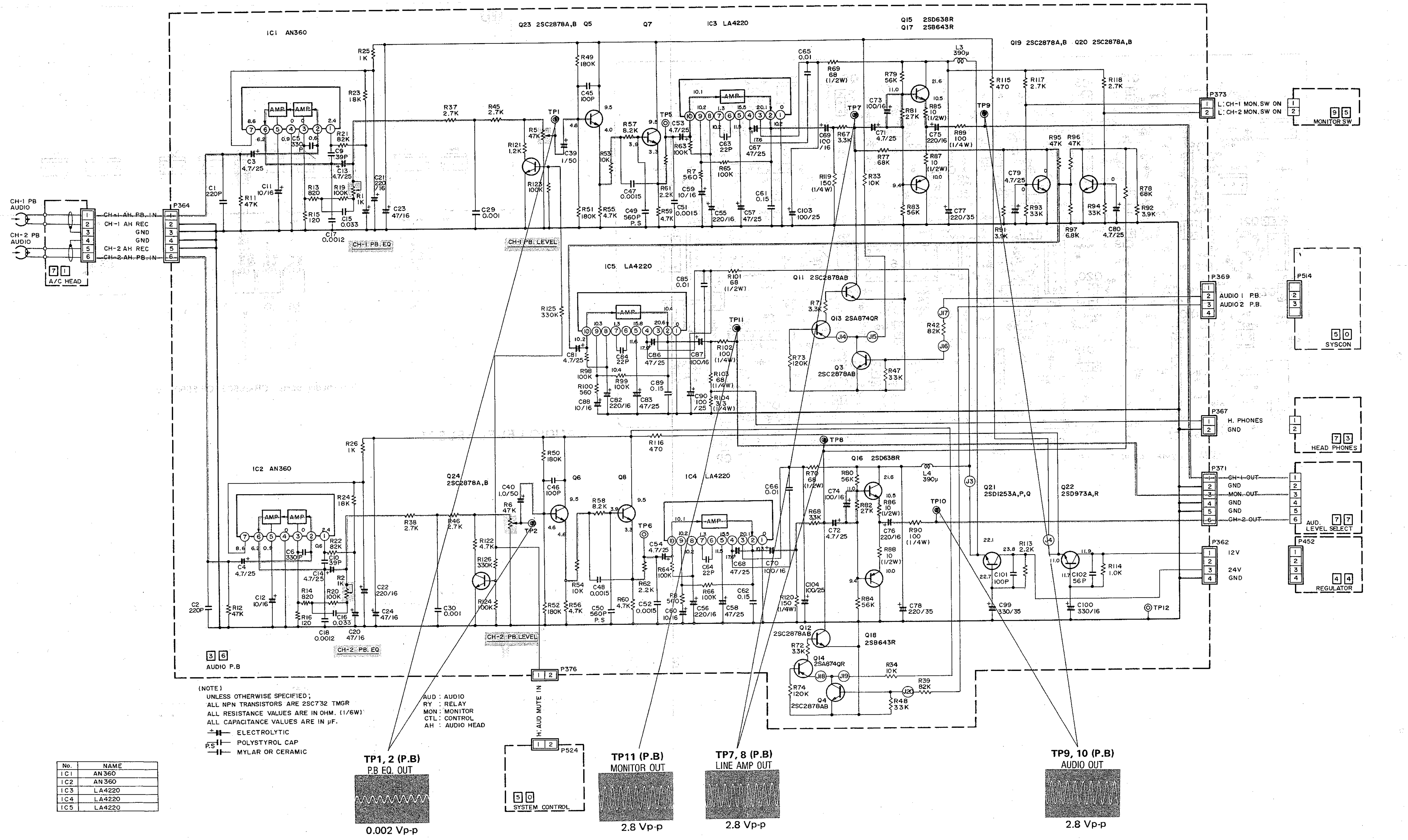
Blue shaded parts : CR-6650E, CP-5550E only

– AUDIO LEVEL SELECT –


AUDIO PB 36
P371
GND
CH-2 AUDIO IN
CH-1 AUDIO IN
JUNCTION 84
P843
CH-2 AUDIO OUT
P902
AUDIO TRANS 90
CH-2
AUDIO OUT
GND
S772
0dB
-20dB
S771
R777
R778
R776
R775
R774
R773
R772
R771
77
P343
CH-1
AUDIO OUT
GND
AUDIO REC 34
CH-1 AUDIO OUT
MONITOR OUT
P903
AUDIO TRANS 90
AUDIO PB 36
P901
CH-2 AUDIO IN
CH-1 AUDIO IN

6.33 AUDIO PLAYBACK CIRCUIT SCHEMATIC DIAGRAM (Player)

Note 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded (   ) parts are critical for safety. Replace only with specified part numbers.



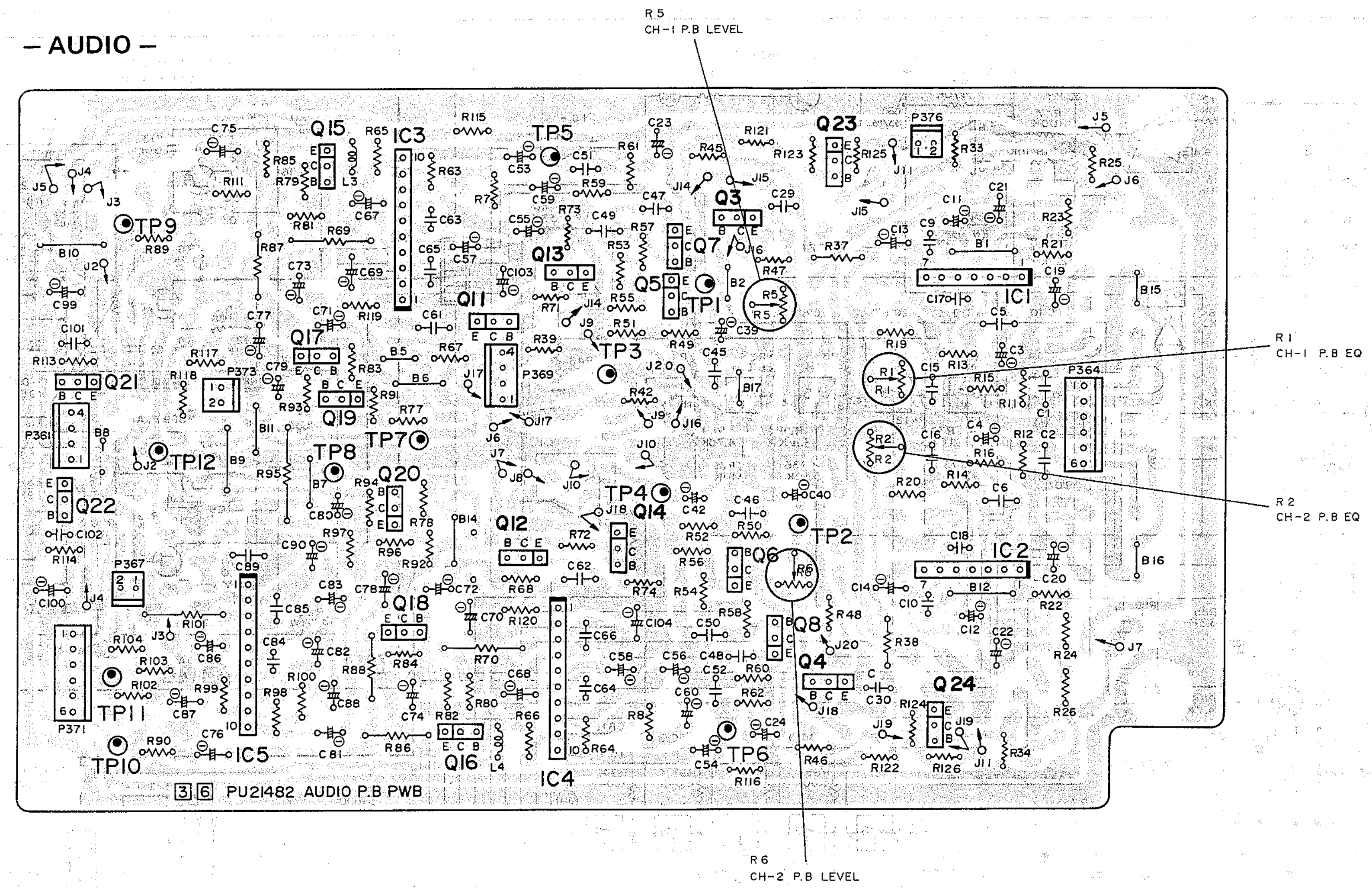
A
B
C
D
E
F
G
H
1
2
3
4
5
6
IC1 AN360
IC2 AN360
IC3 LA4220
IC4 LA4220
IC5 LA4220
Q23 2SC2878A,B
Q5
Q7
Q15 2SD638R
Q17 2SB643R
Q19 2SC2878A,B
Q20 2SC2878A,B
Q11 2SC2878AB
Q13 2SA874QR
Q3 2SC2878AB
Q24 2SC2878A,B
Q6
Q8
Q16 2SD638R
Q21 2SD1253A,P,Q
Q22 2SD973A,R
Q12 2SC2878AB
Q14 2SA874QR
Q18 2SB643R
Q4 2SC2878AB
CH-1 PB AUDIO
CH-2 PB AUDIO
CH-1 AH PB IN
CH-1 AH REC
GND
CH-2 AH REC
CH-2 AH PB IN
7 1 A/C HEAD
P364
CH-1 PB. EQ
CH-1 PB. LEVEL
CH-2 PB. EQ
CH-2 PB. LEVEL
TP1
TP2
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
P373
L: CH-1 MON. SW ON
L: CH-2 MON. SW ON
9 5 MONITOR SW
P369
AUDIO 1 P.B.
AUDIO 2 P.B.
P514
5 0 SYSCON
P367
H. PHONES
GND
7 3 HEAD PHONES
P371
CH-1 OUT
GND
MON. OUT
GND
GND
CH-2 OUT
AUD. LEVEL SELECT
7 7
P362
12V
24V
GND
P452
4 4 REGULATOR
3 6 AUDIO P.B
P376
H. AUD MUTE IN
P524
5 0 SYSTEM CONTROL
AUD : AUDIO
RY : RELAY
MON : MONITOR
CTL : CONTROL
AH : AUDIO HEAD
TP1, 2 (P.B)
P.B EQ. OUT
0.002 Vp-p
TP11 (P.B)
MONITOR OUT
2.8 Vp-p
TP7, 8 (P.B)
LINE AMP OUT
2.8 Vp-p
TP9, 10 (P.B)
AUDIO OUT
2.8 Vp-p

(NOTE)
UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC732 TMGR
ALL RESISTANCE VALUES ARE IN OHM. (1/6W)
ALL CAPACITANCE VALUES ARE IN μF.
ELECTROLYTIC
P.S POLYSTYROL CAP
MYLAR OR CERAMIC

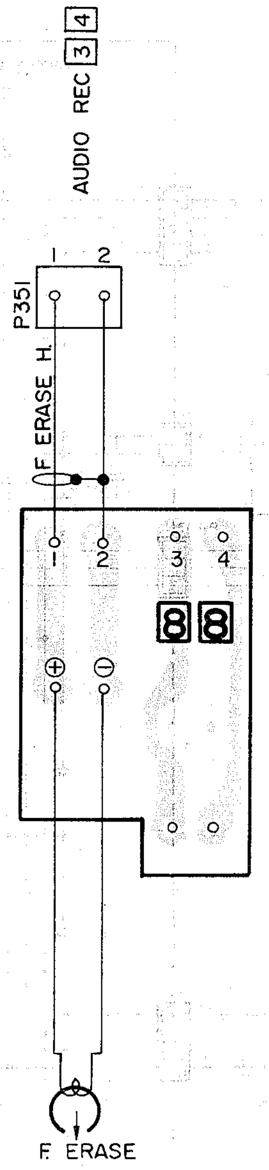
No.	NAME
IC1	AN360
IC2	AN360
IC3	LA4220
IC4	LA4220
IC5	LA4220

6.34 AUDIO PLAYBACK AND ADDRESS & FULL ERASE HEAD CIRCUIT BAORD (Player)

– AUDIO –

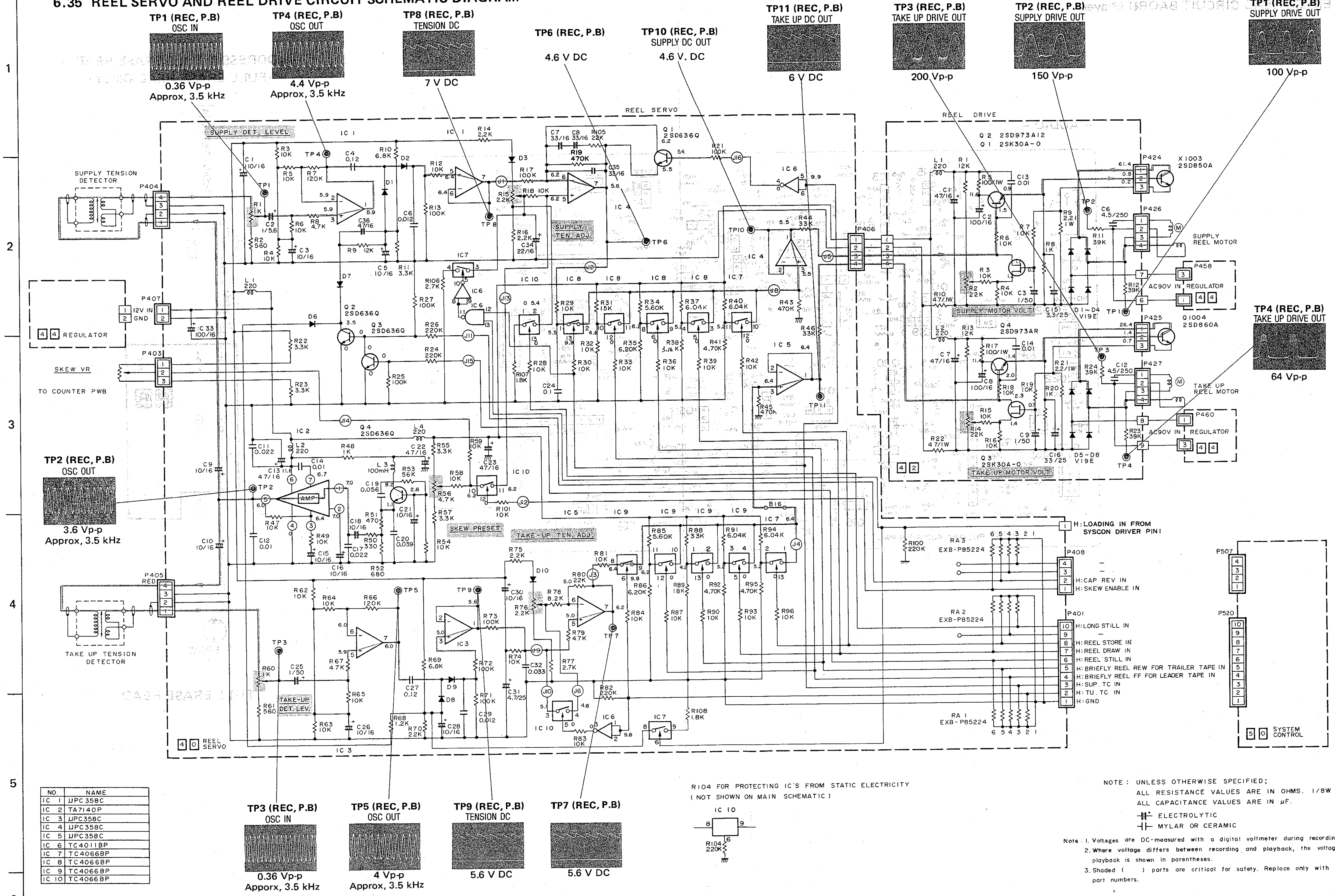

R5
CH-1 P.B LEVEL
R1
CH-1 P.B EQ
R2
CH-2 P.B EQ
R6
CH-2 P.B LEVEL
IC1
IC2
IC3
IC4
IC5
Q3
Q4
Q5
Q7
Q8
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
P361
P364
P367
P369
P371
P373
P376
3 6 PU21482 AUDIO P.B PWB

– ADDRESS & FULL ERASE HEAD –
(FULL ERASE HEAD ONLY)


AUDIO REC 3 4
P351
1
2
F ERASE H
3
4
88
⊕
⊖
F. ERASE

FULL ERASE HEAD

6.35 REEL SERVO AND REEL DRIVE CIRCUIT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP1 (REC, P.B)
OSC IN
0.36 Vp-p
Approx, 3.5 kHz
TP4 (REC, P.B)
OSC OUT
4.4 Vp-p
Approx, 3.5 kHz
TP8 (REC, P.B)
TENSION DC
7 V DC
TP6 (REC, P.B)
4.6 V DC
TP10 (REC, P.B)
SUPPLY DC OUT
4.6 V. DC
TP11 (REC, P.B)
TAKE UP DC OUT
6 V DC
TP3 (REC, P.B)
TAKE UP DRIVE OUT
200 Vp-p
TP2 (REC, P.B)
SUPPLY DRIVE OUT
150 Vp-p
TP1 (REC, P.B)
SUPPLY DRIVE OUT
100 Vp-p
TP4 (REC, P.B)
TAKE UP DRIVE OUT
64 Vp-p
TP2 (REC, P.B)
OSC OUT
3.6 Vp-p
Approx, 3.5 kHz
TP3 (REC, P.B)
OSC IN
0.36 Vp-p
Apporx, 3.5 kHz
TP5 (REC, P.B)
OSC OUT
4 Vp-p
Approx, 3.5 kHz
TP9 (REC, P.B)
TENSION DC
5.6 V DC
TP7 (REC, P.B)
5.6 V DC
REEL SERVO
REEL DRIVE
SUPPLY DET. LEVEL
SUPPLY TEN. ADJ.
SKEW PRESET
TAKE-UP TEN. ADJ.
TAKE-UP DET. LEV.
SUPPLY MOTOR VOLT
TAKE-UP MOTOR VOLT
SUPPLY TENSION DETECTOR
TAKE UP TENSION DETECTOR
P404
P407
12V IN
GND
4 4 REGULATOR
P403
SKEW VR
TO COUNTER PWB
P405
RED
P406
P424
P426
P425
P427
P458
P460
AC90V IN REGULATOR
SUPPLY REEL MOTOR
TAKE UP REEL MOTOR
X1003 2SD850A
Q1004 2SD860A
Q2 2SD973A12
Q1 2SK30A-0
Q4 2SD973AR
Q3 2SK30A-0
D1~D4 V19E
D5-D8 V19E
4 0 REEL SERVO
4 2
H: LOADING IN FROM SYSCON DRIVER PIN1
RA3 EXB-P85224
RA2 EXB-P85224
RA1 EXB-P85224
P408
H: CAP REV IN
H: SKEW ENABLE IN
P401
H: LONG STILL IN
H: REEL STORE IN
H: REEL DRAW IN
H: REEL STILL IN
H: BRIEFLY REEL REW FOR TRAILER TAPE IN
H: BRIEFLY REEL FF FOR LEADER TAPE IN
H: SUP. TC IN
H: TU. TC IN
H: GND
P507
P520
5 0 SYSTEM CONTROL
IC 10
R104 220K

R104 FOR PROTECTING IC'S FROM STATIC ELECTRICITY
(NOT SHOWN ON MAIN SCHEMATIC)

NO	NAME
IC 1	µPC358C
IC 2	TA7140P
IC 3	µPC358C
IC 4	µPC358C
IC 5	µPC358C
IC 6	TC4011BP
IC 7	TC4066BP
IC 8	TC4066BP
IC 9	TC4066BP
IC 10	TC4066BP

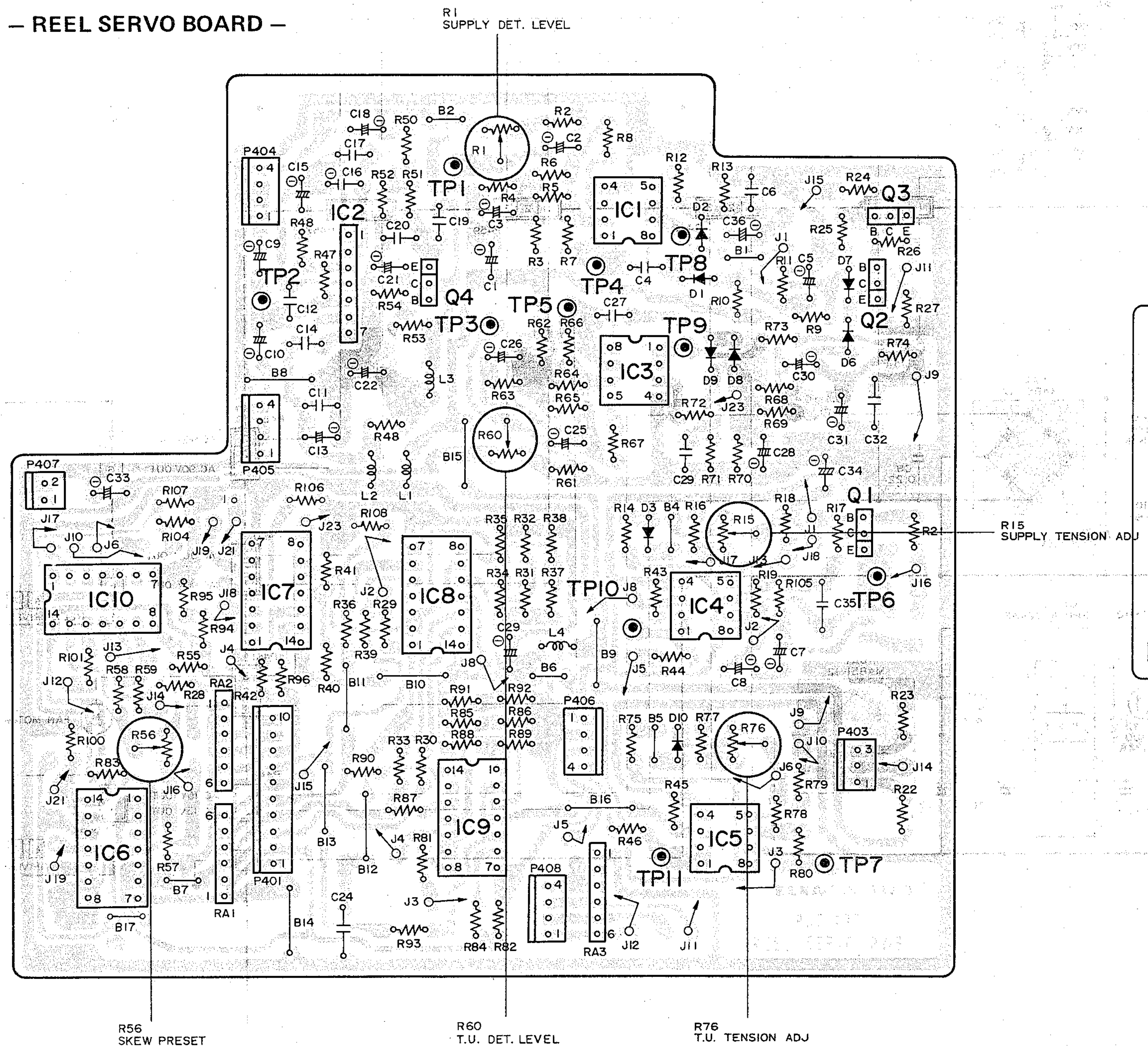
NOTE : UNLESS OTHERWISE SPECIFIED;
ALL RESISTANCE VALUES ARE IN OHMS. 1/8W
ALL CAPACITANCE VALUES ARE IN µF.
⊣⊢+ ELECTROLYTIC
⊣⊢ MYLAR OR CERAMIC

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

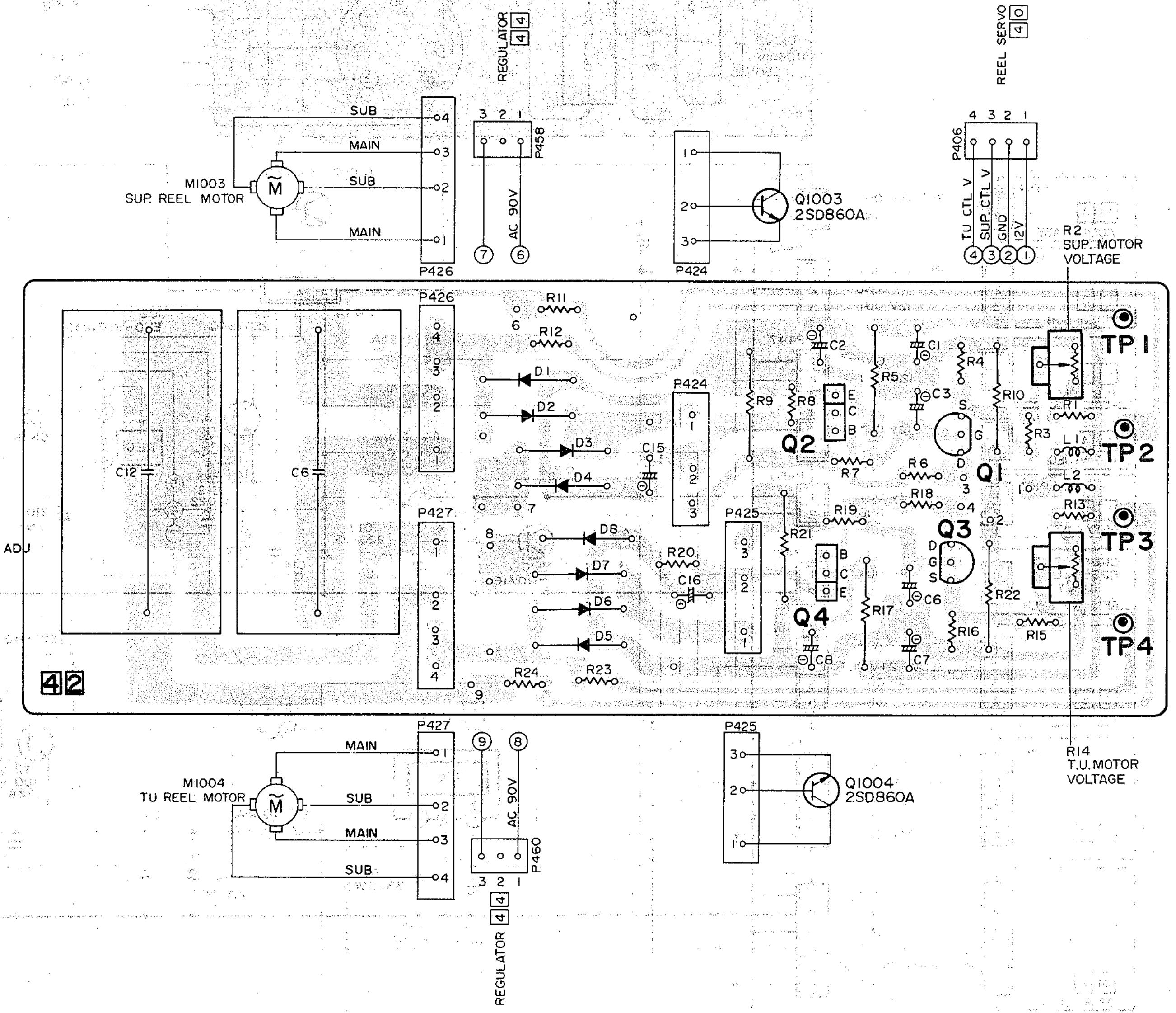
A B C D E F G H

6.36 REEL SERVO AND REEL DRIVE CIRCUIT BOARD

— REEL SERVO BOARD —

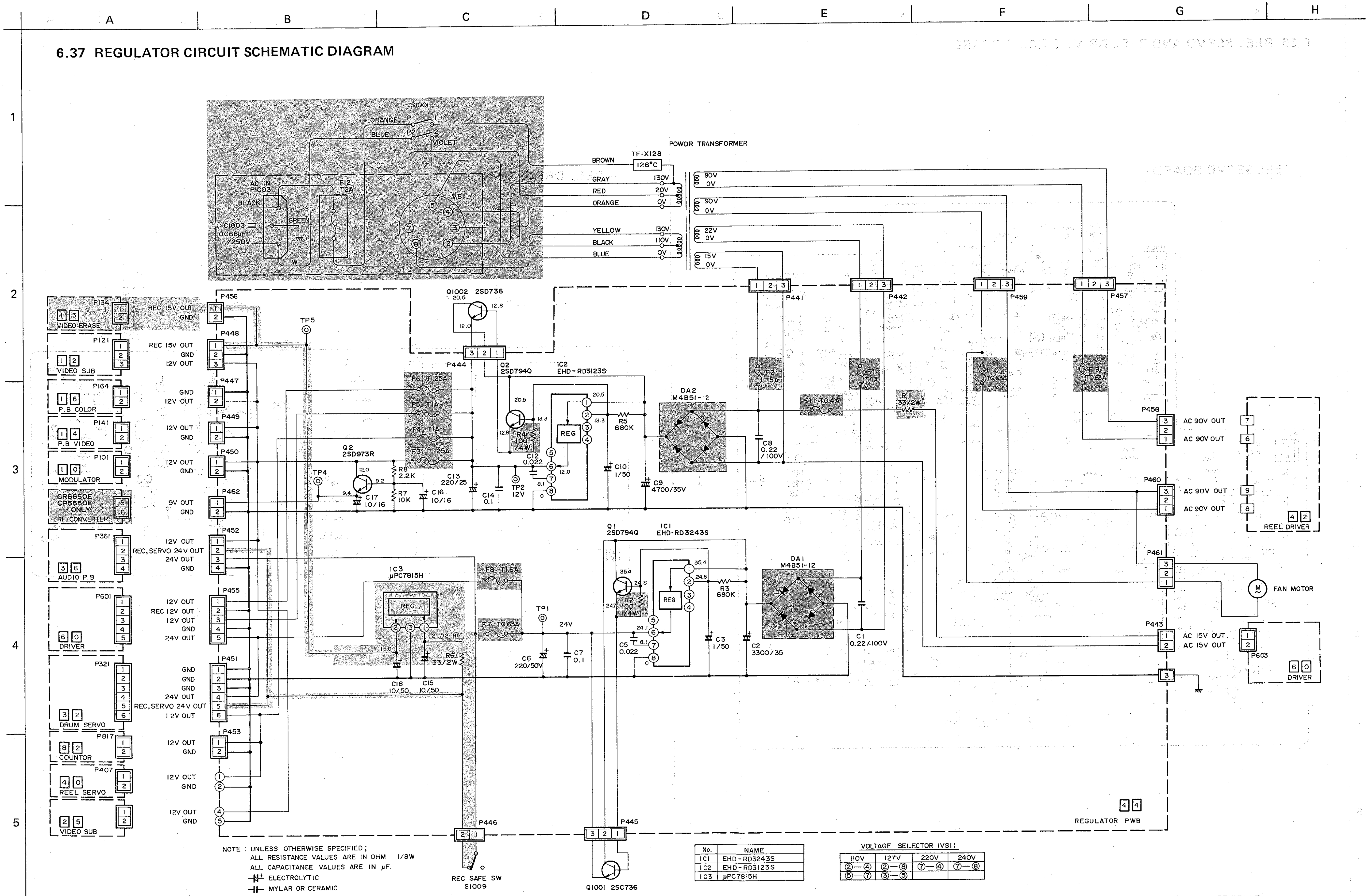

R1
SUPPLY DET. LEVEL
P404
P405
P407
P406
P408
P401
P403
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
Q1
Q2
Q3
Q4
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
RA1
RA2
RA3
R15
SUPPLY TENSION ADJ
R56
SKEW PRESET
R60
T.U. DET. LEVEL
R76
T.U. TENSION ADJ

— REEL DRIVE BOARD —


REGULATOR 44
REEL SERVO 40
M1003
SUP. REEL MOTOR
M1004
TU REEL MOTOR
SUB
MAIN
P426
P427
P424
P425
P458
P460
P406
AC 90V
Q1003
2SD860A
Q1004
2SD860A
TU CTL V
SUP CTL V
GND
12V
R2
SUP. MOTOR VOLTAGE
R14
T.U. MOTOR VOLTAGE
TP1
TP2
TP3
TP4
Q1
Q2
Q3
Q4
42

1 2 3 4 5 6

6.37 REGULATOR CIRCUIT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
S1001
ORANGE
P1
1
BLUE
P2
2
VIOLET
AC IN
P1003
BLACK
GREEN
C1003
0.068μF
/250V
W
F12
T2A
VSI
POWOR TRANSFORMER
TF:X128
126°C
BROWN
GRAY
RED
ORANGE
YELLOW
BLACK
BLUE
130V
20V
0V
130V
110V
0V
90V
0V
90V
0V
22V
0V
15V
0V
P441
P442
P459
P457
P134
REC 15V OUT
GND
VIDEO ERASE
P456
TP5
P121
REC 15V OUT
GND
12V OUT
VIDEO SUB
P448
P164
GND
12V OUT
P.B COLOR
P447
P141
12V OUT
GND
P.B VIDEO
P449
P101
12V OUT
GND
MODULATOR
P450
CR6650E
CP5550E
ONLY
RF CONVERTER
9V OUT
GND
P462
P361
12V OUT
REC, SERVO 24V OUT
24V OUT
GND
AUDIO P.B
P452
P601
12V OUT
REC 12V OUT
12V OUT
GND
24V OUT
DRIVER
P455
P321
GND
GND
GND
24V OUT
REC, SERVO 24V OUT
12V OUT
DRUM SERVO
P451
P817
12V OUT
GND
COUNTOR
P453
P407
12V OUT
GND
REEL SERVO
12V OUT
GND
VIDEO SUB
Q1002 2SD736
20.5
12.8
12.0
P444
Q2
2SD794Q
IC2
EHD-RD3123S
20.5
13.3
12.8
R4
100
1/4W
REG
R5
680K
C12
0.022
12.0
8.1
C10
1/50
C9
4700/35V
DA2
M4B51-12
F6 T1.25A
F5 T1A
F4 T1A
F3 T1.25A
F2 T5A
F1 T4A
F10 T0.63A
F9 T0.63A
F11 T0.4A
R1
33/2W
C8
0.22
/100V
Q2
2SD973R
12.0
9.2
9.4
TP4
R8
2.2K
R7
10K
C17
10/16
C16
10/16
C13
220/25
C14
0.1
TP2
12V
P458
AC 90V OUT
AC 90V OUT
P460
AC 90V OUT
AC 90V OUT
REEL DRIVER
P461
FAN MOTOR
M
P443
AC 15V OUT
AC 15V OUT
P603
DRIVER
IC3
μPC7815H
REG
F8 T1.6A
F7 T0.63A
TP1
24V
21.7(21.9)
15.0
R6
33/2W
C18
10/50
C15
10/50
C6
220/50V
C7
0.1
Q1
2SD794Q
IC1
EHD-RD3243S
35.4
24.8
24.7
24.1
8.1
R2
100
1/4W
R3
680K
C5
0.022
C3
1/50
C2
3300/35
DA1
M4B51-12
C1
0.22/100V
REGULATOR PWB
P446
REC SAFE SW
S1009
P445
Q1001 2SC736

NOTE : UNLESS OTHERWISE SPECIFIED;
ALL RESISTANCE VALUES ARE IN OHM 1/8W
ALL CAPACITANCE VALUES ARE IN μF.
—||+ ELECTROLYTIC
—||— MYLAR OR CERAMIC

No.	NAME
IC1	EHD-RD3243S
IC2	EHD-RD3123S
IC3	μPC7815H

VOLTAGE SELECTOR (VS1)

110V	127V	220V	240V
②—④	②—⑧	⑦—④	⑦—⑧
⑤—⑦	③—⑤		

Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

Red shaded parts : Not employed in CP-5550E.

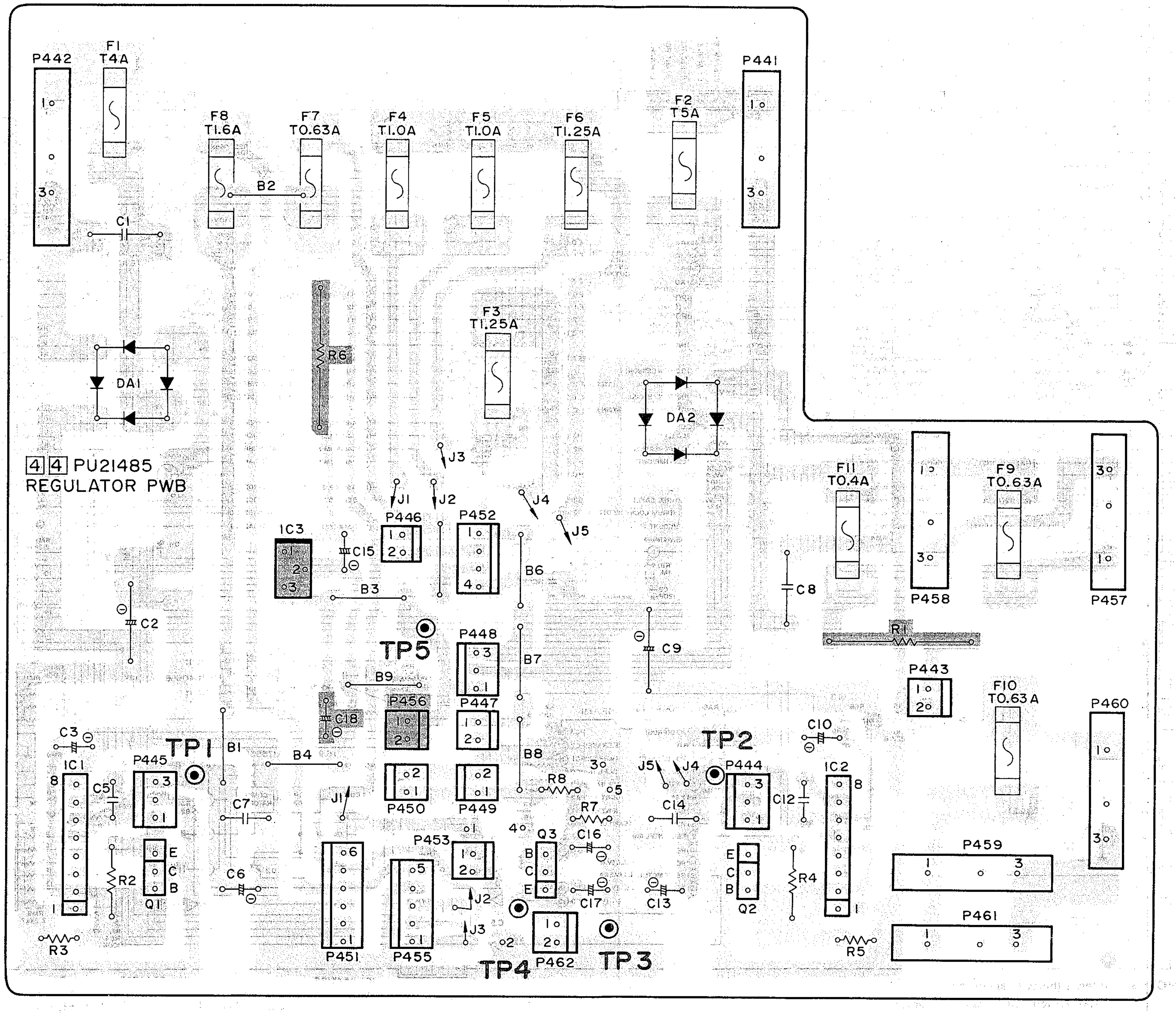
6-38 REGULATOR SCHEMATIC
(REEL SERVO & DRIVE BOARD)

A B C D E F G H

6.38 REGULATOR CIRCUIT BOARD

1

– REGULATOR –


P442
F1
T4A
F8
T1.6A
F7
T0.63A
F4
T1.0A
F5
T1.0A
F6
T1.25A
F2
T5A
P441
B2
C1
R6
F3
T1.25A
DA1
DA2
4 4 PU21485
REGULATOR PWB
J3
J1
J2
J4
J5
P446
P452
IC3
C15
B3
B6
TP5
P448
B7
C2
C9
C8
F11
T0.4A
P458
F9
T0.63A
P457
R1
P443
F10
T0.63A
P460
B9
P456
C18
P447
C3
TP1
B1
B4
P445
IC1
C5
C7
J1
P450
P449
B8
R8
R7
C16
Q3
TP2
J5
J4
P444
C10
C12
C14
IC2
P453
C6
R2
Q1
P451
P455
J2
J3
C17
C13
Q2
R4
P459
P461
R3
R5
TP4
P462
TP3

2

3

4

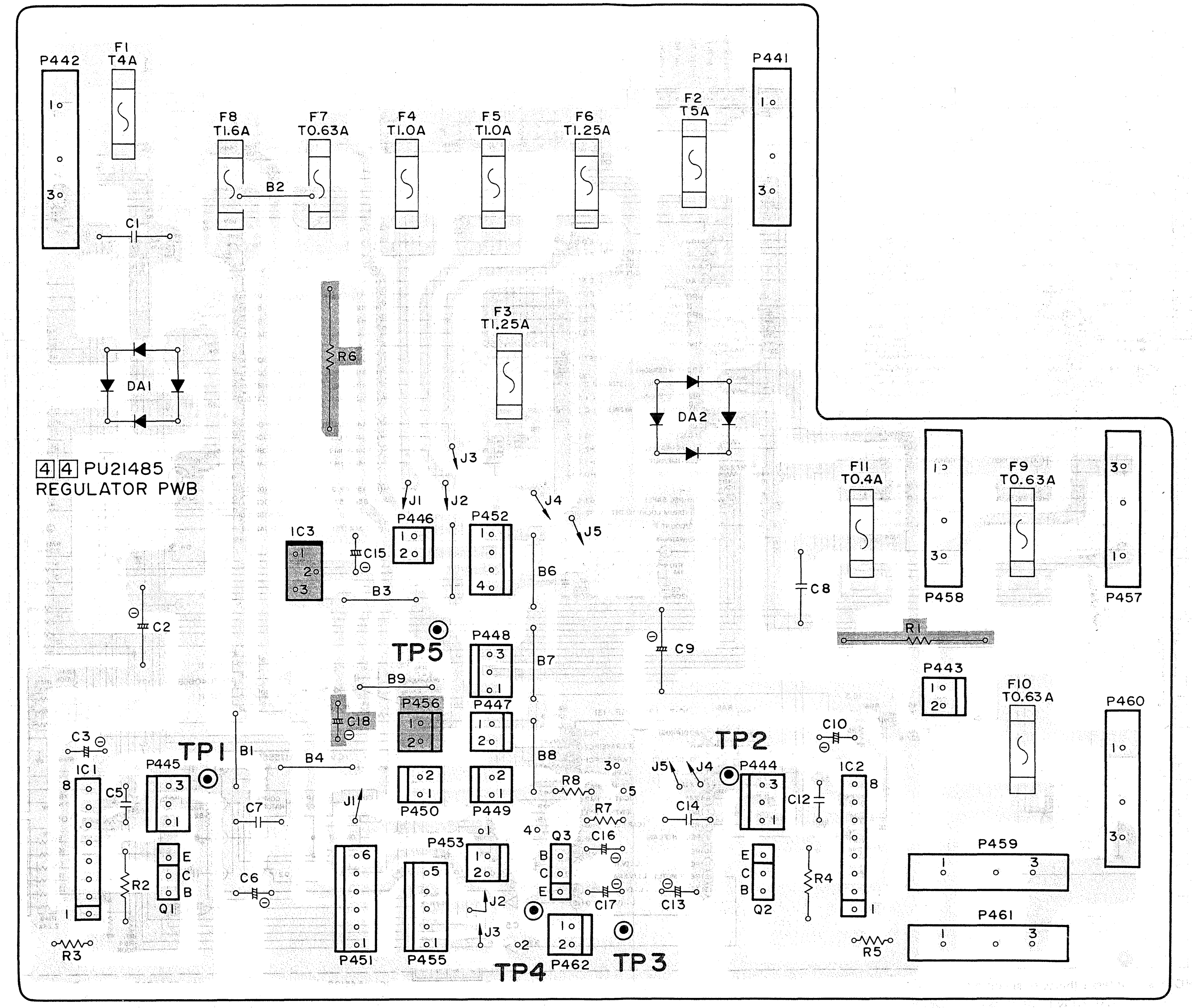
5

Red shaded parts : Not employed in CP-5550E.

6

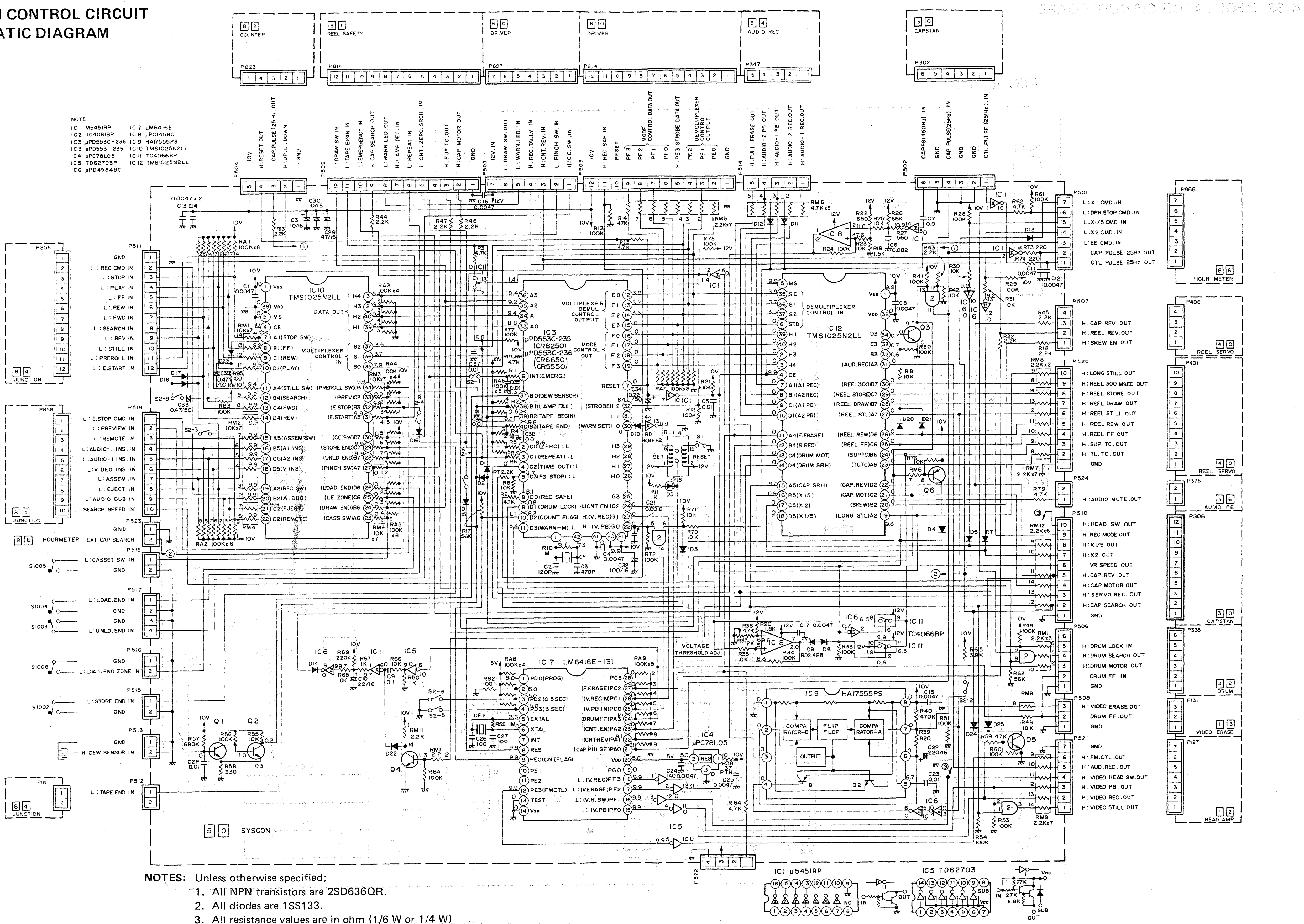
6.38 REGULATOR CIRCUIT BOARD

– REGULATOR –


P442
F1
T4A
F8
T1.6A
F7
T0.63A
F4
T1.0A
F5
T1.0A
F6
T1.25A
F2
T5A
P441
B2
C1
R6
F3
T1.25A
DA1
DA2
4 4 PU21485
REGULATOR PWB
J3
J1
J2
J4
J5
IC3
C15
P446
P452
B6
B3
C8
F11
T0.4A
F9
T0.63A
P458
P457
C2
TP5
P448
C9
R1
B7
B9
P443
F10
T0.63A
P456
P447
P460
C18
C3
TP1
B1
B4
B8
TP2
C10
IC1
P445
P450
P449
R8
R7
C14
P444
C12
IC2
C5
C7
J1
P453
Q3
C16
Q1
R2
C6
J2
C17
C13
Q2
R4
P459
P461
R3
P451
P455
J3
TP4
P462
TP3
R5
E C B

Red shaded parts : Not employed in CP-5550E.

6.39 SYSTEM CONTROL CIRCUIT SCHEMATIC DIAGRAM

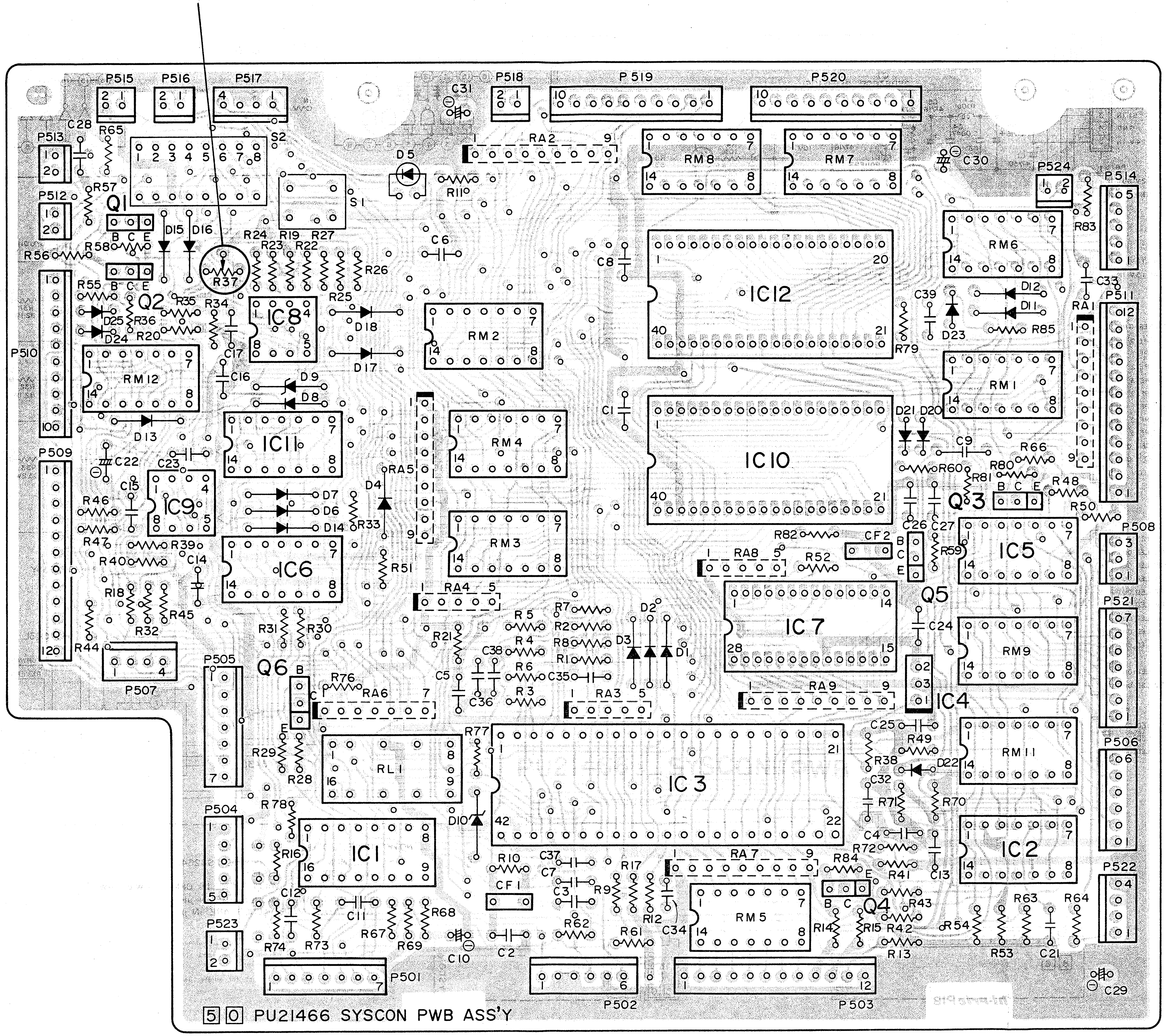

NOTE
IC1 M54519P
IC2 TC4081BP
IC3 μPD553C-236
IC3 μPD553-235
IC4 μPC78L05
IC5 TD62703P
IC6 μPD4584BC
IC7 LM6416E
IC8 μPC1458C
IC9 HA17555PS
IC10 TMS1025N2LL
IC11 TC4066BP
IC12 TMS1025N2LL
8 2 COUNTER P823
8 1 REEL SAFETY P814
6 0 DRIVER P607
6 0 DRIVER P614
3 4 AUDIO REC P347
3 0 CAPSTAN P302
P504 P509 P505 P503 P514 P502
P856 P511 8 4 JUNCTION
P858 P519 8 4 JUNCTION
8 6 HOURMETER P523 EXT CAP SEARCH
P518 S1005 L:CASSET.SW.IN
P517 S1004 S1003 L:LOAD.END IN L:UNLD.END IN
P516 S1008 L:LOAD.END ZONE IN
P515 S1002 L:STORE END IN
P513 H:DEW SENSOR IN
P512 PIN1 8 4 JUNCTION L:TAPE END IN
5 0 SYSCON
IC10 TMS1025N2LL
IC3 μPD553C-235 (CR8250) μPD553C-236 (CR6650) (CR5550)
IC12 TMS1025N2LL
IC 7 LM6416E-131
IC9 HA17555PS
IC4 μPC78L05
TC4066BP
VOLTAGE THRESHOLD ADJ.
P501 P507 P520 P524 P510 P506 P508 P521 P522
P868 8 6 HOUR METER
P408 4 0 REEL SERVO
P401 4 0 REEL SERVO
P376 3 6 AUDIO PB
P306 3 0 CAPSTAN
P335 3 2 DRUM
P131 1 3 VIDEO ERASE
P127 1 2 HEAD AMP
IC1 μ54519P
IC5 TD62703

NOTES: Unless otherwise specified;

1. All NPN transistors are 2SD636QR.
2. All diodes are 1SS133.
3. All resistance values are in ohm (1/6 W or 1/4 W)
4. All inductance values are in μH.
5. All capacitance values are in μF.
6. Voltages are DC-measured with a digital voltmeter during stop mode.

A B C D E F G H

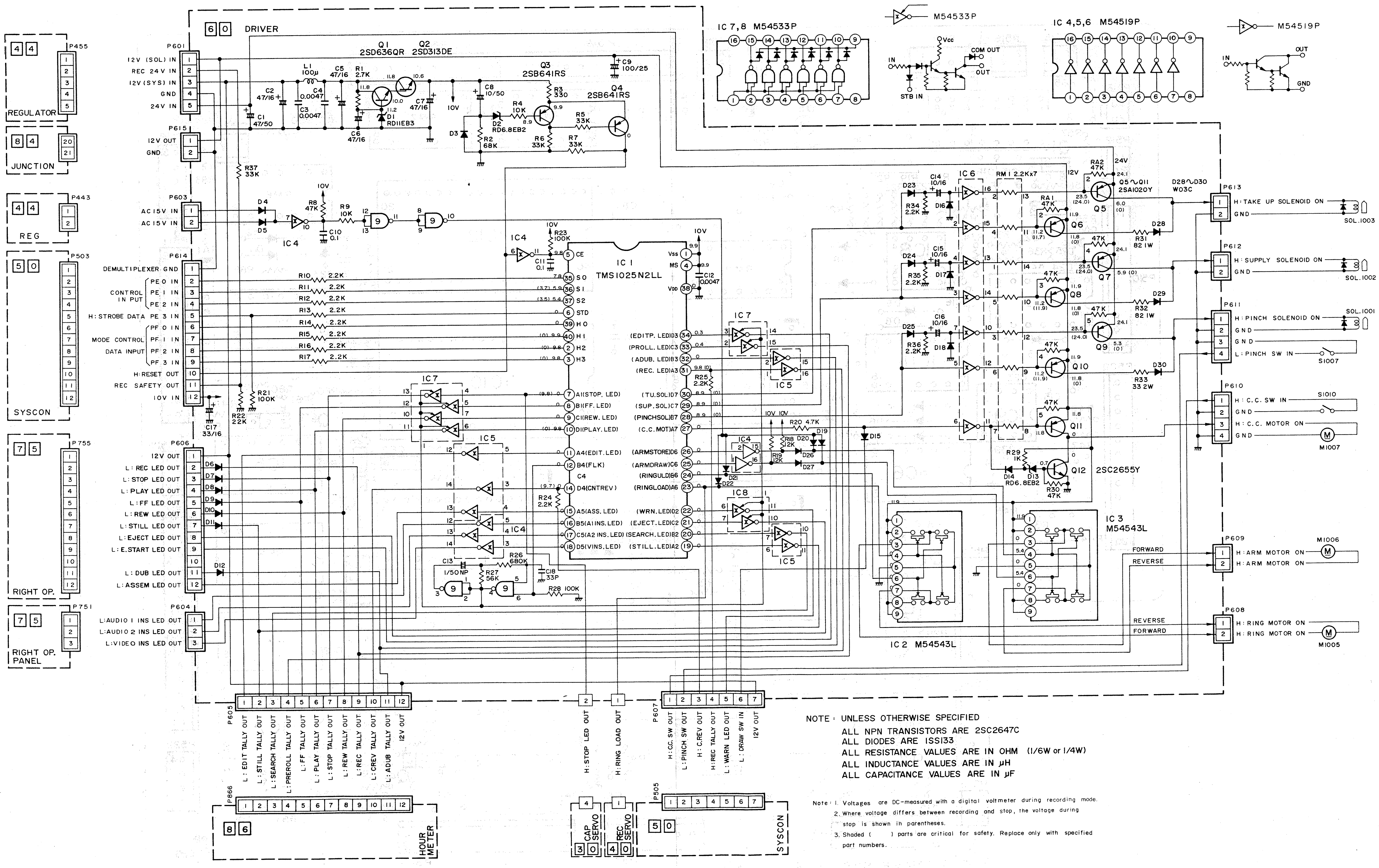
6.40 SYSTEM CONTROL CIRCUIT BOARD



R 37
V.TH (VOLTAGE THRESHOLD) ADJ.

1
2
3
4
5
6
P515
P516
P517
P518
P519
P520
P513
P512
P510
P509
P507
P505
P504
P523
P501
P502
P503
P524
P514
P511
P508
P521
P506
P522
C28
R65
R57
Q1
B C E
R58
R56
R55
Q2
R35
R34
R36
D25
D24
R20
D15
D16
R37
S2
S1
R24
R19
R27
R23
R22
R26
R25
IC8
D18
D17
C17
C16
D9
D8
RM12
D13
IC11
C22
C23
C15
IC9
R46
R47
R40
R39
C14
IC6
R18
R32
R45
R44
D7
D6
D14
R33
D4
RA5
R51
C31
D5
R11
C6
RA2
RM2
RM4
RM3
RA4
C8
C1
RM8
RM7
IC12
IC10
C30
RM6
R83
C33
RA1
D12
D11
C39
D23
R85
R79
RM1
D21
D20
C9
R66
R60
R80
R81
Q3
R48
R50
C26
C27
R82
CF2
RA8
R52
R59
IC5
Q5
IC7
C24
RM9
RA9
IC4
R5
R7
R2
R8
R1
R4
R6
C35
R3
D2
D3
D1
R21
C38
C5
C36
RA3
R31
R30
Q6
R76
RA6
R29
R28
RL1
R77
IC3
D10
R78
R16
IC1
C12
C11
R68
R67
R69
R74
R73
C10
R10
C37
C7
C3
CF1
C2
R9
R17
R12
R62
R61
C34
RA7
RM5
R84
Q4
R41
R43
R42
R14
R15
R13
R54
C25
R49
R38
D22
RM11
C32
R71
R70
C4
R72
C13
IC2
R63
R64
R53
C21
C29
50 PU21466 SYSCON PWB ASS'Y

6.41 SYSTEM CONTROL DRIVE CIRCUIT SCHEMATIC DIAGRAM

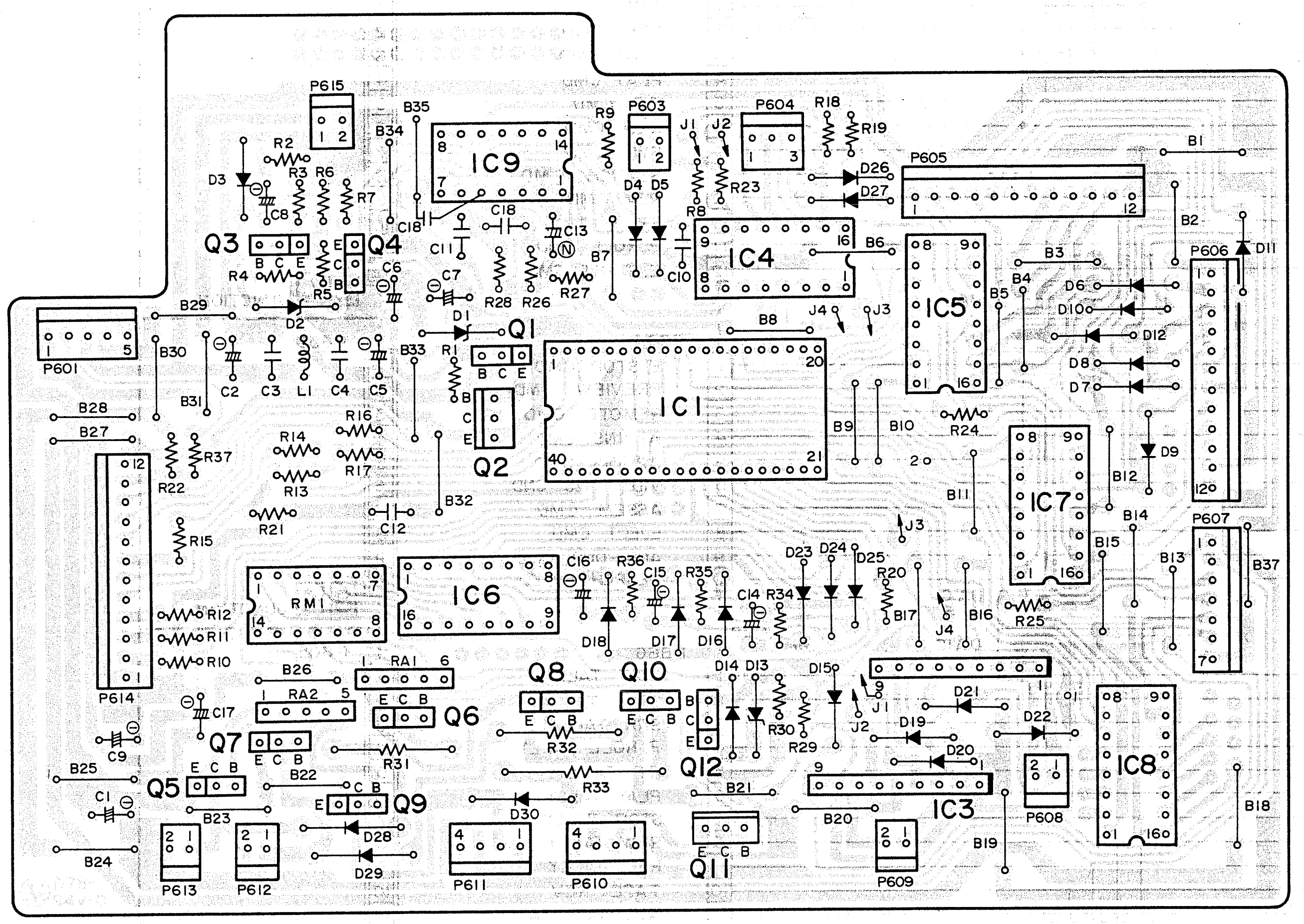

A
B
C
D
E
F
G
H
1
2
3
4
5
6
60 DRIVER
44 REGULATOR P455
84 JUNCTION
44 REG P443
50 SYSCON P503
75 RIGHT OP. P755
75 RIGHT OP. PANEL P751
P601
12V (SOL) IN
REC 24V IN
12V (SYS) IN
GND
24V IN
P615
12V OUT
GND
P603
AC 15V IN
AC 15V IN
P614
DEMULTIPLEXER GND
CONTROL IN PUT
PE 0 IN
PE 1 IN
PE 2 IN
H: STROBE DATA PE 3 IN
MODE CONTROL DATA INPUT
PF 0 IN
PF 1 IN
PF 2 IN
PF 3 IN
H: RESET OUT
REC SAFETY OUT
10V IN
P606
12V OUT
L: REC LED OUT
L: STOP LED OUT
L: PLAY LED OUT
L: FF LED OUT
L: REW LED OUT
L: STILL LED OUT
L: EJECT LED OUT
L: E.START LED OUT
L: DUB LED OUT
L: ASSEM LED OUT
P604
L: AUDIO 1 INS LED OUT
L: AUDIO 2 INS LED OUT
L: VIDEO INS LED OUT
Q1 2SD636QR
Q2 2SD313DE
Q3 2SB641RS
Q4 2SB641RS
L1 100μ
C1 47/50
C2 47/16
C3 0.0047
C4 0.0047
C5 47/16
C6 47/16
C7 47/16
C8 10/50
C9 100/25
R1 2.7K
R2 68K
R3 330
R4 10K
R5 33K
R6 33K
R7 33K
D1 RD11EB3
D2 RD6.8EB2
D3
R37 33K
D4
D5
IC4
R8 47K
R9 10K
C10 0.1
R21 100K
R22 22K
C17 33/16
IC1 TMS1025N2LL
R23 100K
C11 0.1
C12 0.0047
5 CE
35 S0
36 S1
37 S2
6 STD
39 H0
40 H1
2 H2
3 H3
7 A1(STOP. LED)
8 B1(FF. LED)
9 C1(REW. LED)
10 D1(PLAY. LED)
11 A4(EDIT. LED)
12 B4(FLK)
C4
14 D4(CNTREV)
15 A5(ASS. LED)
16 B5(A1 INS. LED)
17 C5(A2 INS. LED)
18 D5(VINS. LED)
Vss 1
MS 4
VDD 38
(EDITP. LED)D3 34
(PROLL. LED)C3 33
(ADUB. LED)B3 32
(REC. LED)A3 31
(TU. SOL)D7 30
(SUP. SOL)C7 29
(PINCHSOL)B7 28
(C.C. MOT)A7 27
(ARMSTORE)D6 26
(ARMDRAW)C6 25
(RINGULD)B6 24
(RINGLOAD)A6 23
(WRN. LED)D2 22
(EJECT. LED)C2 21
(SEARCH. LED)B2 20
(STILL. LED)A2 19
R10 2.2K
R11 2.2K
R12 2.2K
R13 2.2K
R14 2.2K
R15 2.2K
R16 2.2K
R17 2.2K
R24 2.2K
R25 2.2K
R26 680K
R27 56K
R28 100K
C13 1/50NP
C18 33P
R20 4.7K
R18 12K
R19 12K
D6 D7 D8 D9 D10 D11 D12
D15 D19 D20 D21 D22 D26 D27
IC5
IC7
IC8
IC6
RM1 2.2Kx7
D23 D24 D25
C14 10/16
C15 10/16
C16 10/16
R34 2.2K
R35 2.2K
R36 2.2K
D16 D17 D18
RA1 47K
RA2 47K
12V
24V
Q5∿Q11 2SA1020Y
Q5 Q6 Q7 Q8 Q9 Q10 Q11
Q12 2SC2655Y
R29 1K
R30 47K
D13 D14 RD6.8EB2
R31 82 1W
R32 82 1W
R33 33 2W
D28∿D30 W03C
D28 D29 D30
P613
H: TAKE UP SOLENOID ON
GND
SOL.1003
P612
H: SUPPLY SOLENOID ON
GND
SOL.1002
P611
H: PINCH SOLENOID ON
GND
GND
L: PINCH SW IN
SOL.1001
S1007
P610
H: C.C. SW IN
GND
H: C.C. MOTOR ON
GND
S1010
M1007
IC3 M54543L
IC2 M54543L
P609
FORWARD
REVERSE
H: ARM MOTOR ON
H: ARM MOTOR ON
M1006
P608
REVERSE
FORWARD
H: RING MOTOR ON
H: RING MOTOR ON
M1005
IC 7,8 M54533P
M54533P
Vcc
COM OUT
IN
OUT
STB IN
IC 4,5,6 M54519P
M54519P
IN
OUT
GND
P605
L: EDIT TALLY OUT
L: STILL TALLY OUT
L: SEARCH TALLY OUT
L: PREROLL TALLY OUT
L: FF TALLY OUT
L: PLAY TALLY OUT
L: STOP TALLY OUT
L: REW TALLY OUT
L: REC TALLY OUT
L: CREV TALLY OUT
L: ADUB TALLY OUT
12V OUT
P866
86 HOUR METER
H: STOP LED OUT
H: RING LOAD OUT
P607
H: C.C. SW OUT
L: PINCH SW OUT
H: C.REV OUT
H: REC TALLY OUT
L: WARN LED OUT
L: DRAW SW IN
12V OUT
CAP SERVO 30
REC SERVO 40
P505
50 SYSCON

NOTE : UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF

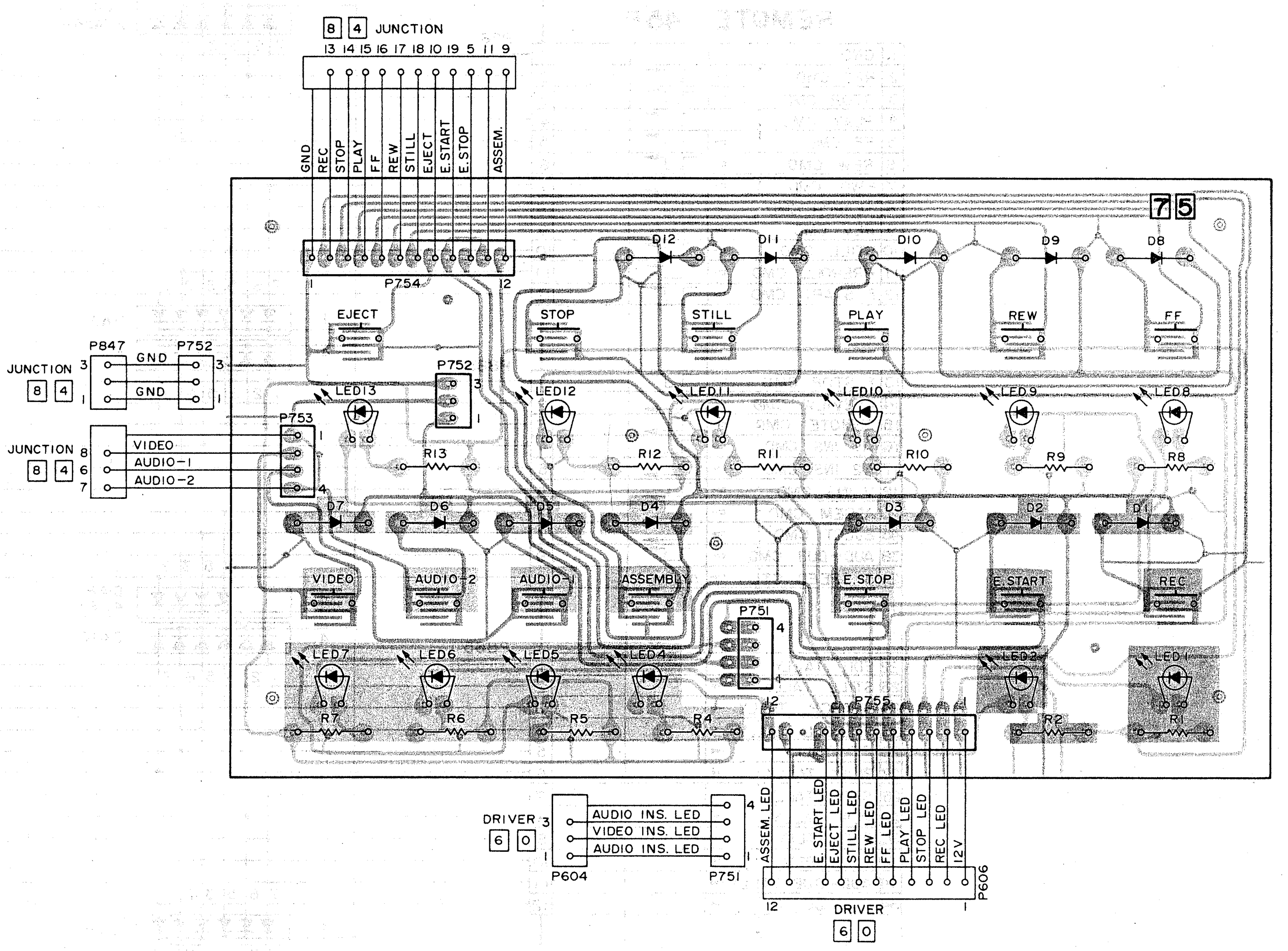
Note : 1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and stop, the voltage during stop is shown in parentheses.
3. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

6.42 SYSTEM CONTROL DRIVE, HOUSING JUNCTION AND RIGHT OPERATION CIRCUIT BOARD

– DRIVE –


P615
P603
P604
P605
P606
P607
P601
P614
P613
P612
P611
P610
P609
P608
IC1
IC3
IC4
IC5
IC6
IC7
IC8
IC9
RM1
RA1
RA2
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12

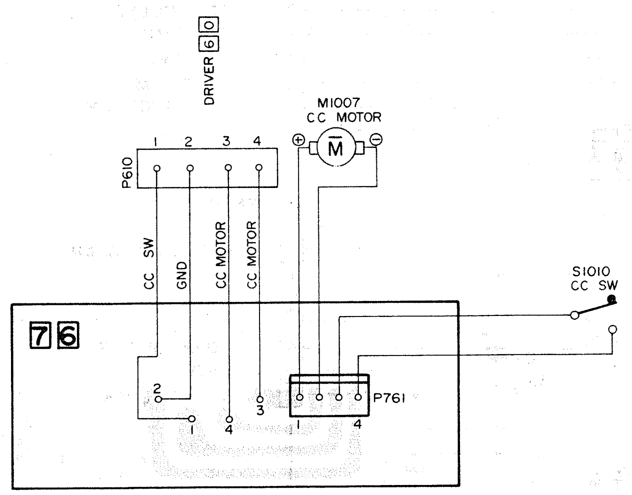
– RIGHT OPERATION –


8 4 JUNCTION
GND
REC
STOP
PLAY
F.F
REW
STILL
EJECT
E.START
E.STOP
ASSEM.
75
P754
EJECT
STOP
STILL
PLAY
REW
FF
JUNCTION 8 4
P847
P752
P753
VIDEO
AUDIO-1
AUDIO-2
VIDEO
AUDIO-2
AUDIO
ASSEMBLY
E.STOP
E.START
REC
P751
P755
DRIVER 6 0
P604
AUDIO INS. LED
VIDEO INS. LED
AUDIO INS. LED
ASSEM. LED
E.START LED
EJECT LED
STILL LED
REW LED
FF LED
PLAY LED
STOP LED
REC LED
12V
P606
DRIVER 6 0

▨ Red shaded parts : Not employed in CP-5550E.

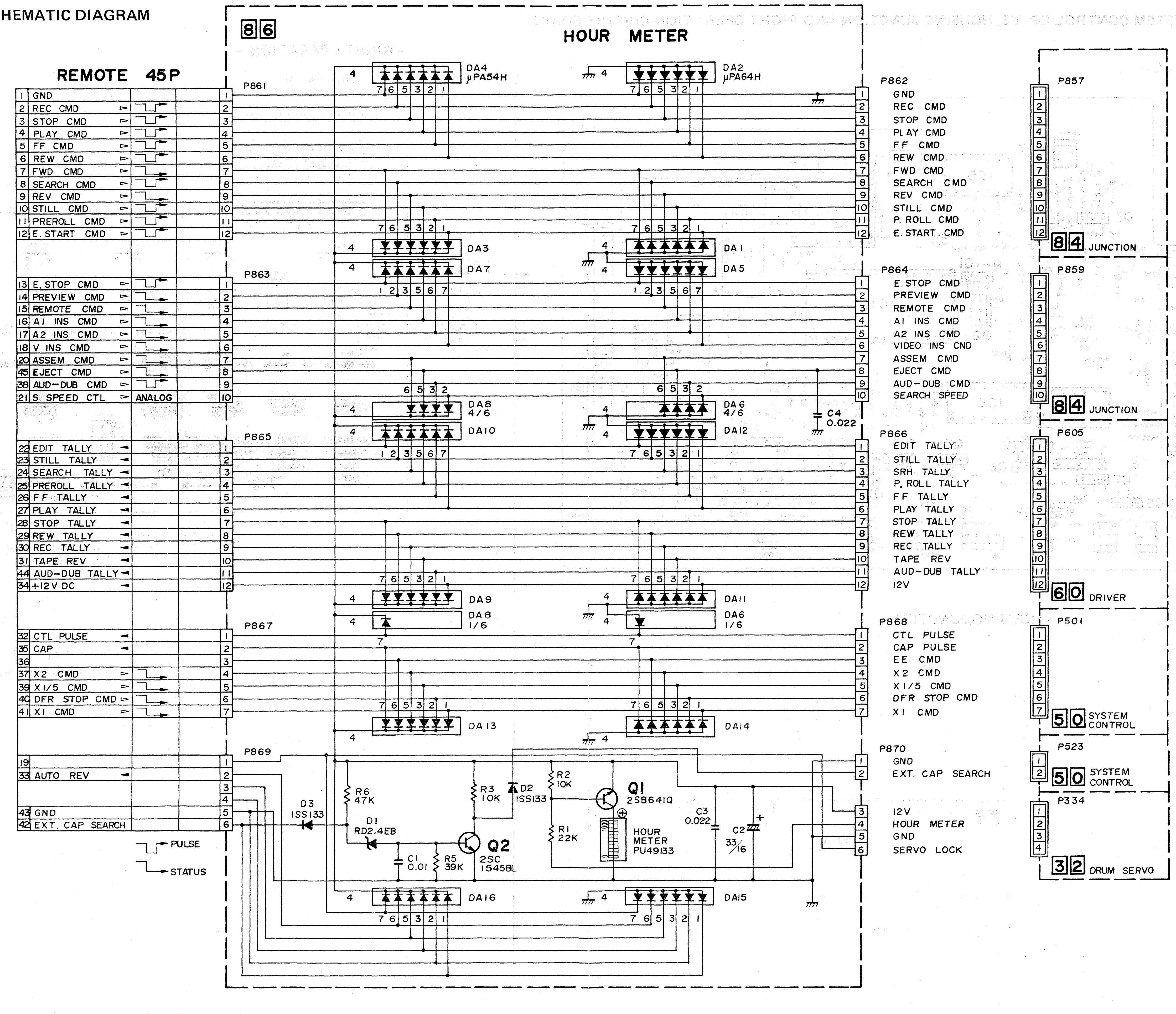
▨ Blue shaded parts : Not employed in CR-6650E and CP-5550E.

– HOUSING JUNCTION –


DRIVER 6 0
M1007
CC MOTOR
P610
CC SW
GND
CC MOTOR
CC MOTOR
S1010
CC SW
76
P761

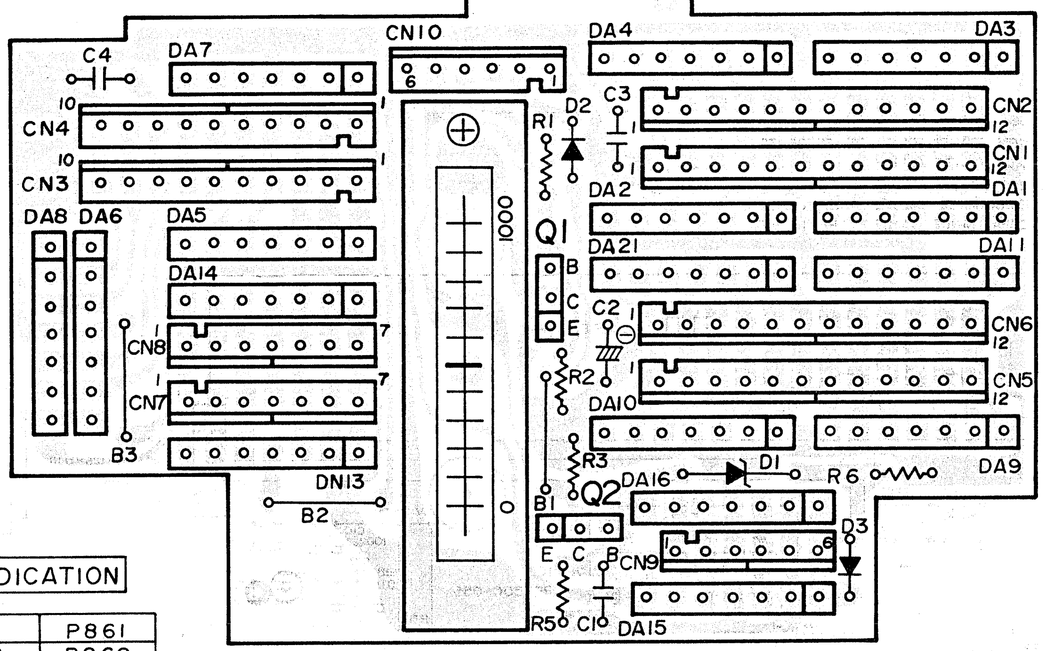
CC : CASSETTE COMPARTMENT

6.43 HOUR METER SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
86
HOUR METER
REMOTE 45P
1 GND
2 REC CMD
3 STOP CMD
4 PLAY CMD
5 FF CMD
6 REW CMD
7 FWD CMD
8 SEARCH CMD
9 REV CMD
10 STILL CMD
11 PREROLL CMD
12 E. START CMD
13 E. STOP CMD
14 PREVIEW CMD
15 REMOTE CMD
16 A1 INS CMD
17 A2 INS CMD
18 V INS CMD
20 ASSEM CMD
45 EJECT CMD
38 AUD-DUB CMD
21 S SPEED CTL
ANALOG
22 EDIT TALLY
23 STILL TALLY
24 SEARCH TALLY
25 PREROLL TALLY
26 FF TALLY
27 PLAY TALLY
28 STOP TALLY
29 REW TALLY
30 REC TALLY
31 TAPE REV
44 AUD-DUB TALLY
34 +12V DC
32 CTL PULSE
35 CAP
36
37 X2 CMD
39 X1/5 CMD
40 DFR STOP CMD
41 X1 CMD
19
33 AUTO REV
43 GND
42 EXT. CAP SEARCH
PULSE
STATUS
P861
P863
P865
P867
P869
DA4
μPA54H
DA2
μPA64H
DA3
DA7
DA1
DA5
DA8
4/6
DA10
DA6
4/6
DA12
DA9
DA8
1/6
DA11
DA6
1/6
DA13
DA14
DA16
DA15
7 6 5 3 2 1
1 2 3 5 6 7
6 5 3 2
4
C4
0.022
R6
47K
D3
1SS133
D1
RD2.4EB
C1
0.01
R5
39K
Q2
2SC
1545BL
R3
10K
D2
1SS133
R2
10K
R1
22K
Q1
2SB641Q
HOUR
METER
PU49133
C3
0.022
C2
33/16
P862
GND
REC CMD
STOP CMD
PLAY CMD
FF CMD
REW CMD
FWD CMD
SEARCH CMD
REV CMD
STILL CMD
P. ROLL CMD
E. START CMD
P864
E. STOP CMD
PREVIEW CMD
REMOTE CMD
A1 INS CMD
A2 INS CMD
VIDEO INS CND
ASSEM CMD
EJECT CMD
AUD-DUB CMD
SEARCH SPEED
P866
EDIT TALLY
STILL TALLY
SRH TALLY
P. ROLL TALLY
FF TALLY
PLAY TALLY
STOP TALLY
REW TALLY
REC TALLY
TAPE REV
AUD-DUB TALLY
12V
P868
CTL PULSE
CAP PULSE
EE CMD
X2 CMD
X1/5 CMD
DFR STOP CMD
X1 CMD
P870
GND
EXT. CAP SEARCH
12V
HOUR METER
GND
SERVO LOCK
P857
84 JUNCTION
P859
84 JUNCTION
P605
60 DRIVER
P501
50 SYSTEM CONTROL
P523
50 SYSTEM CONTROL
P334
32 DRUM SERVO

6.44 HOUR METER, LEFT OP., PHOTO TRANSISTOR, REEL FG AND FIP CIRCUIT BOARD

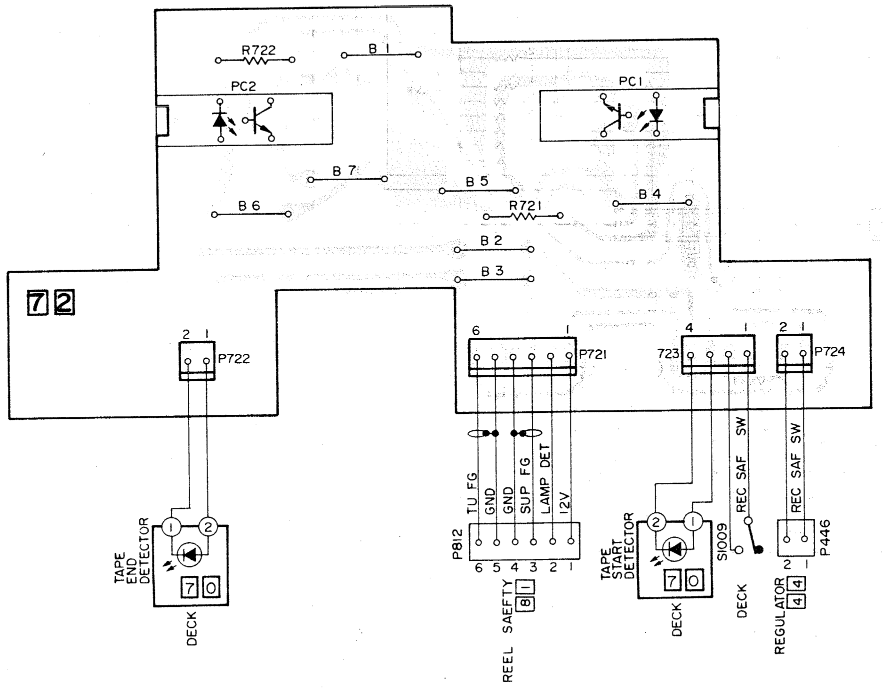
— HOUR METER —


C4
DA7
CN10
DA4
DA3
CN4
CN3
DA8
DA6
DA5
DA14
CN8
CN7
B3
DN13
B2
R1
D2
C3
CN2
CN1
DA2
DA1
Q1
DA21
DA11
B
C
E
C2
CN6
CN5
R2
DA10
R3
DA16
D1
R6
DA9
B1
Q2
D3
CN9
R5
C1
DA15
1000

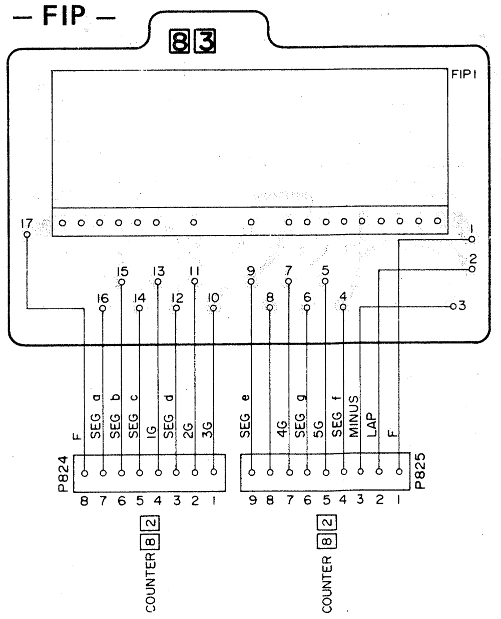
INDICATION

CN 1	P861
CN 2	P862
CN 3	P863
CN 4	P864
CN 5	P865
CN 6	P866
CN 7	P867
CN 8	P868
CN 9	P869
CN 10	P870

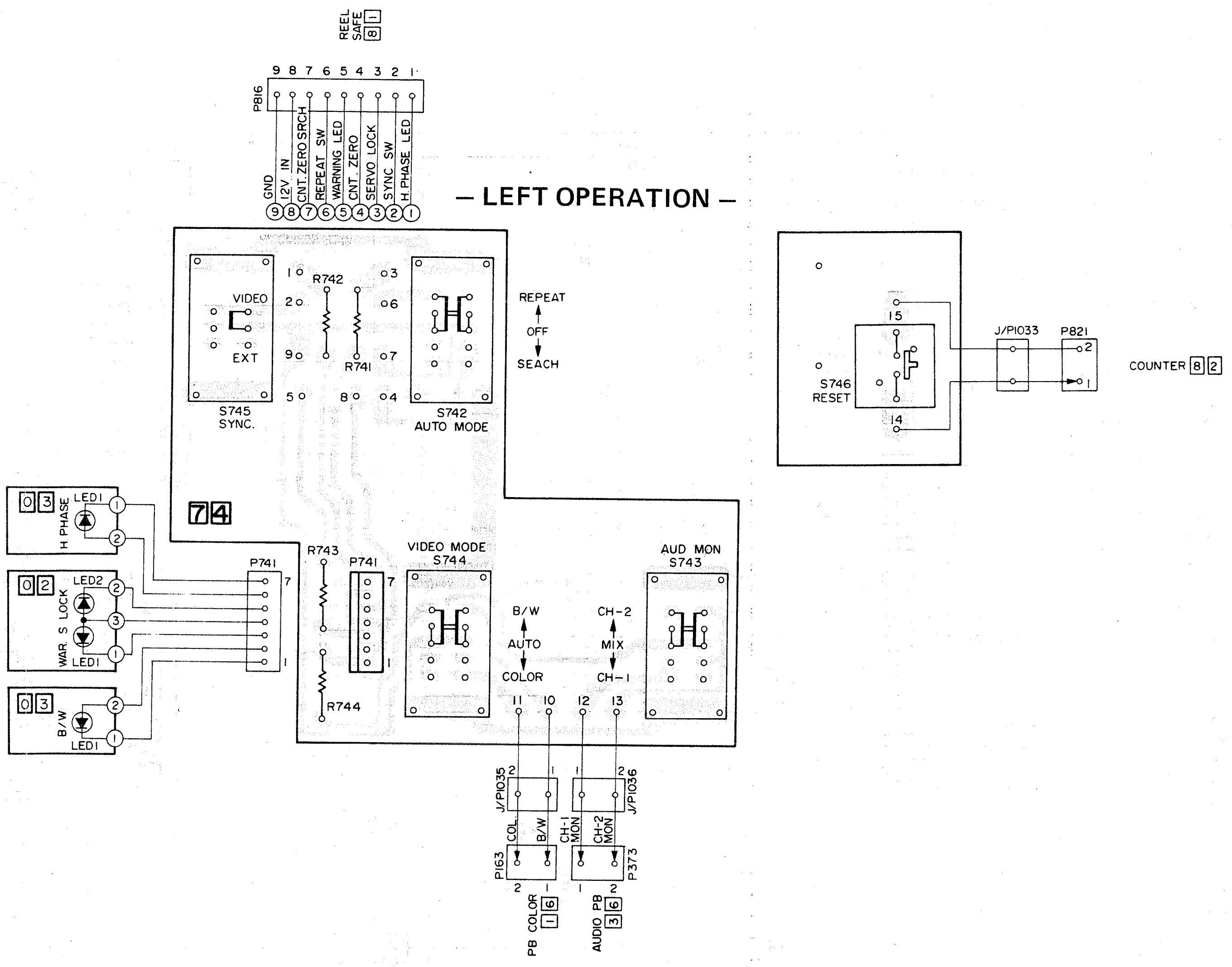
— REEL FG —


R722
B1
PC2
PC1
B7
B5
B4
B6
R721
B2
B3
72
P722
P721
723
P724
TAPE END DETECTOR
70
DECK
P812
TU FG
GND
GND
SUP FG
LAMP DET
12V
REEL SAFETY 81
TAPE START DETECTOR
70
DECK
S1009
REC SAF SW
DECK
REC SAF SW
P446
REGULATOR 44

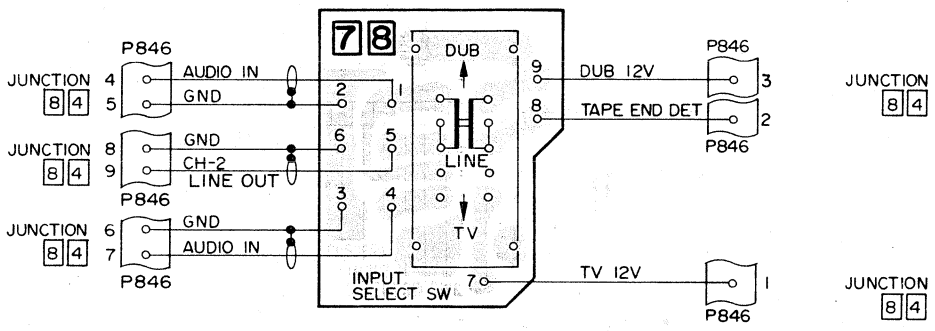
— FIP —


83
FIP1
P824
F
SEG a
SEG b
SEG c
1G
SEG d
2G
3G
SEG e
4G
SEG g
5G
SEG f
MINUS
LAP
F
P825
COUNTER 82
COUNTER 82

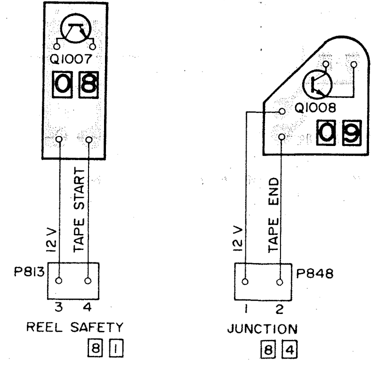
— LEFT OPERATION —


REEL SAFE 81
P816
GND
12V IN
CNT ZERO SRCH
REPEAT SW
WARNING LED
CNT ZERO
SERVO LOCK
SYNC SW
H PHASE LED
VIDEO
EXT
R742
R741
REPEAT
OFF
SEACH
S745 SYNC.
S742 AUTO MODE
S746 RESET
J/P1033
P821
COUNTER 82
74
03 H PHASE LED1
02 WAR S LOCK LED2 LED1
03 B/W LED1
P741
R743
R744
VIDEO MODE S744
B/W
AUTO
COLOR
AUD MON S743
CH-2
MIX
CH-1
J/P1035
J/P1036
COL
B/W
CH-1 MON
CH-2 MON
P163
P373
PB COLOR 16
AUDIO PB 36

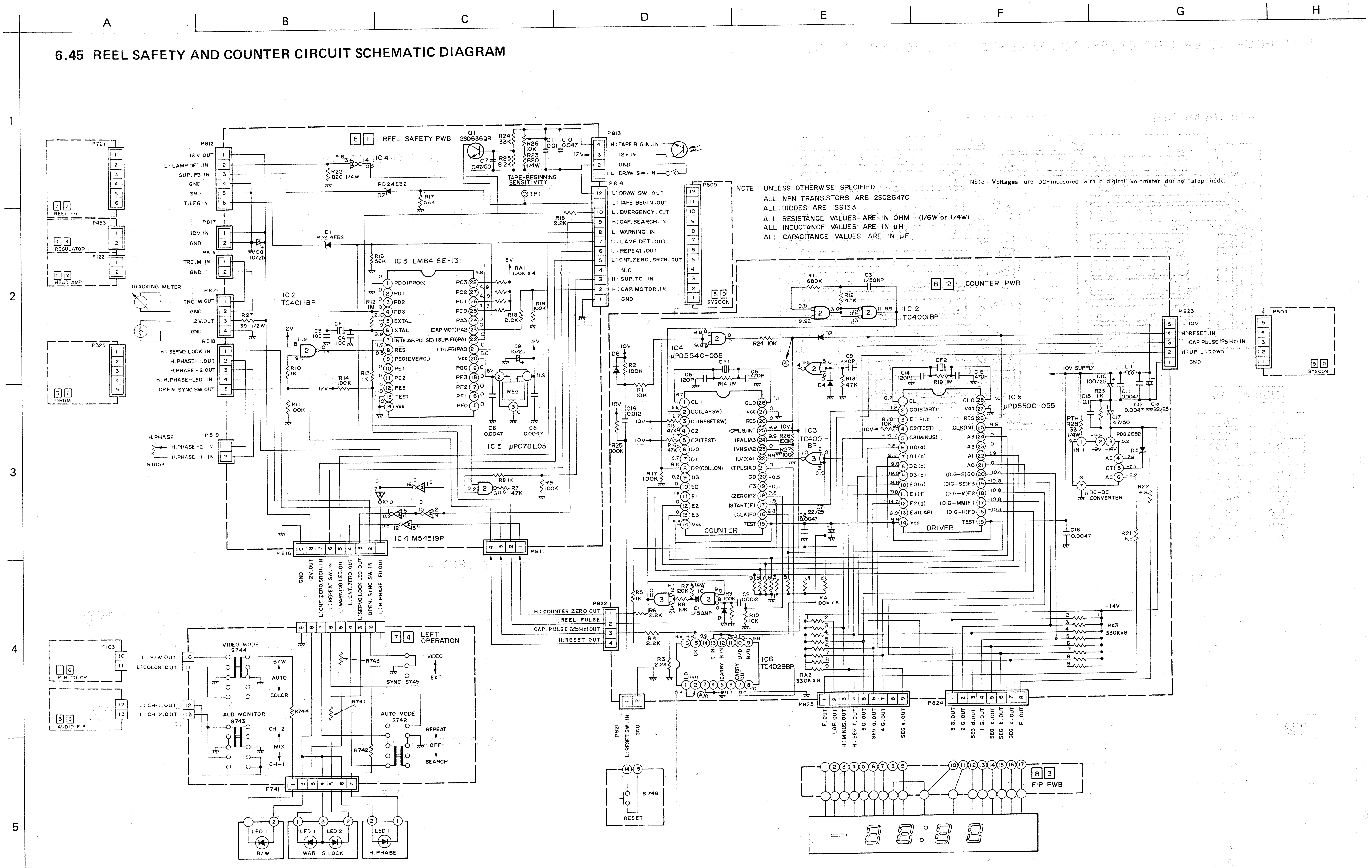
— INPUT SELECT —


78
P846
JUNCTION 84
AUDIO IN
GND
GND
CH-2
LINE OUT
GND
AUDIO IN
DUB
LINE
TV
INPUT SELECT SW
DUB 12V
TAPE END DET
TV 12V
P846
JUNCTION 84

— PHOTO TRANSISTOR —


Q1007
08
Q1008
09
12V
TAPE START
P813
REEL SAFETY 81
12V
TAPE END
P848
JUNCTION 84

6.45 REEL SAFETY AND COUNTER CIRCUIT SCHEMATIC DIAGRAM

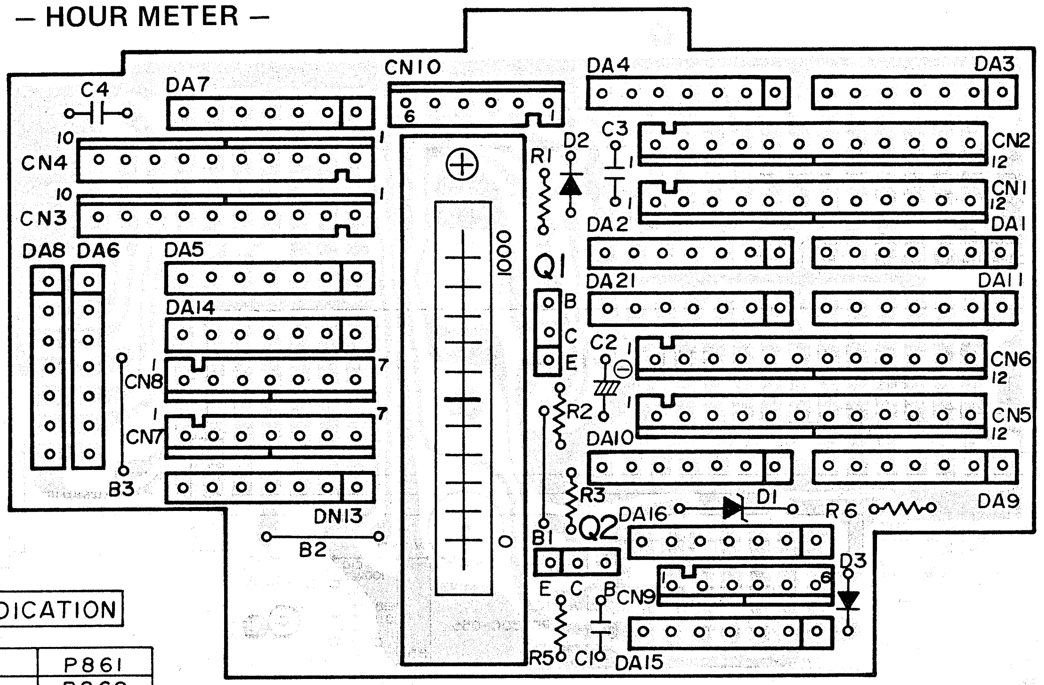

A
B
C
D
E
F
G
H
1
2
3
4
5
6
8 1 REEL SAFETY PWB
8 2 COUNTER PWB
8 3 FIP PWB
7 4 LEFT OPERATION
P721
7 2 REEL FG
P453
4 4 REGULATOR
P122
1 2 HEAD AMP
TRACKING METER
P325
3 2 DRUM
P163
1 6 P.B COLOR
3 6 AUDIO P.B
P812
12 V.OUT
L: LAMP DET. IN
SUP. FG. IN
GND
GND
TU.FG IN
P817
12V. IN
GND
P815
TRC.M. IN
GND
P810
TRC.M. OUT
GND
12 V.OUT
GND
P818
H: SERVO LOCK. IN
H. PHASE - 1. OUT
H. PHASE - 2. OUT
H: H. PHASE-LED. IN
OPEN: SYNC SW. OUT
H. PHASE
P819
H. PHASE - 2 IN
H. PHASE - 1. IN
R1003
Q1 2SD636QR
IC 4
IC2 TC4011BP
IC3 LM6416E-131
IC 5 µPC78L05
IC 4 M54519P
REG
TAPE-BEGINNING SENSITIVITY
TP1
P813
H: TAPE BIGIN. IN
12V IN
GND
L: DRAW SW. IN
P814
L: DRAW SW. OUT
L: TAPE BEGIN. OUT
L: EMERGENCY. OUT
H: CAP. SEARCH. IN
L: WARNING. IN
H: LAMP DET. OUT
L: REPEAT. OUT
L: CNT. ZERO. SRCH. OUT
N.C.
H: SUP. TC. IN
H: CAP. MOTOR. IN
GND
P509
5 0 SYSCON
P816
GND
12V. OUT
L: CNT. ZERO. SRCH. IN
L: REPEAT SW. IN
L: WARNING LED. OUT
L: CNT. ZERO. OUT
L: SERVO LOCK LED. OUT
OPEN: SYNC SW. IN
L: H. PHASE LED. OUT
P811
P822
H: COUNTER ZERO. OUT
REEL PULSE
CAP. PULSE (25Hz) OUT
H: RESET. OUT
IC4 µPD554C-058
COUNTER
IC3 TC4001-BP
IC 2 TC4001BP
IC 5 µPD550C-055
DRIVER
IC6 TC4029BP
DC-DC CONVERTER
10V SUPPLY
P823
10V
H: RESET. IN
CAP PULSE (25Hz) IN
H: UP. L: DOWN
GND
P504
5 0 SYSCON
RA1 100K x 8
RA2 330K x 8
RA3 330K x 8
P825
F. OUT
LAP. OUT
H: MINUS OUT
H: SEG f. OUT
5G. OUT
SEG g. OUT
4G. OUT
SEG e. OUT
P824
3 G. OUT
2 G. OUT
SEG d. OUT
1 G. OUT
SEG c. OUT
SEG b. OUT
SEG a. OUT
F. OUT
P821
L: RESET SW. IN
GND
S746
RESET
L: B/W. OUT
L: COLOR. OUT
L: CH-1. OUT
L: CH-2. OUT
VIDEO MODE S744
B/W
AUTO
COLOR
AUD MONITOR S743
CH-2
MIX
CH-1
VIDEO
EXT
SYNC S745
AUTO MODE S742
REPEAT
OFF
SEARCH
R741
R742
R743
R744
P741
LED 1
B/W
LED 1
LED 2
WAR
S.LOCK
LED 1
H. PHASE

NOTE : UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE 1SS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W or 1/4W)
ALL INDUCTANCE VALUES ARE IN µH
ALL CAPACITANCE VALUES ARE IN µF

Note : **Voltages** are DC-measured with a digital voltmeter during stop mode.

6.44 HOUR METER, LEFT OP., PHOTO TRANSISTOR, REEL FG AND FIP CIRCUIT BOARD

– HOUR METER –

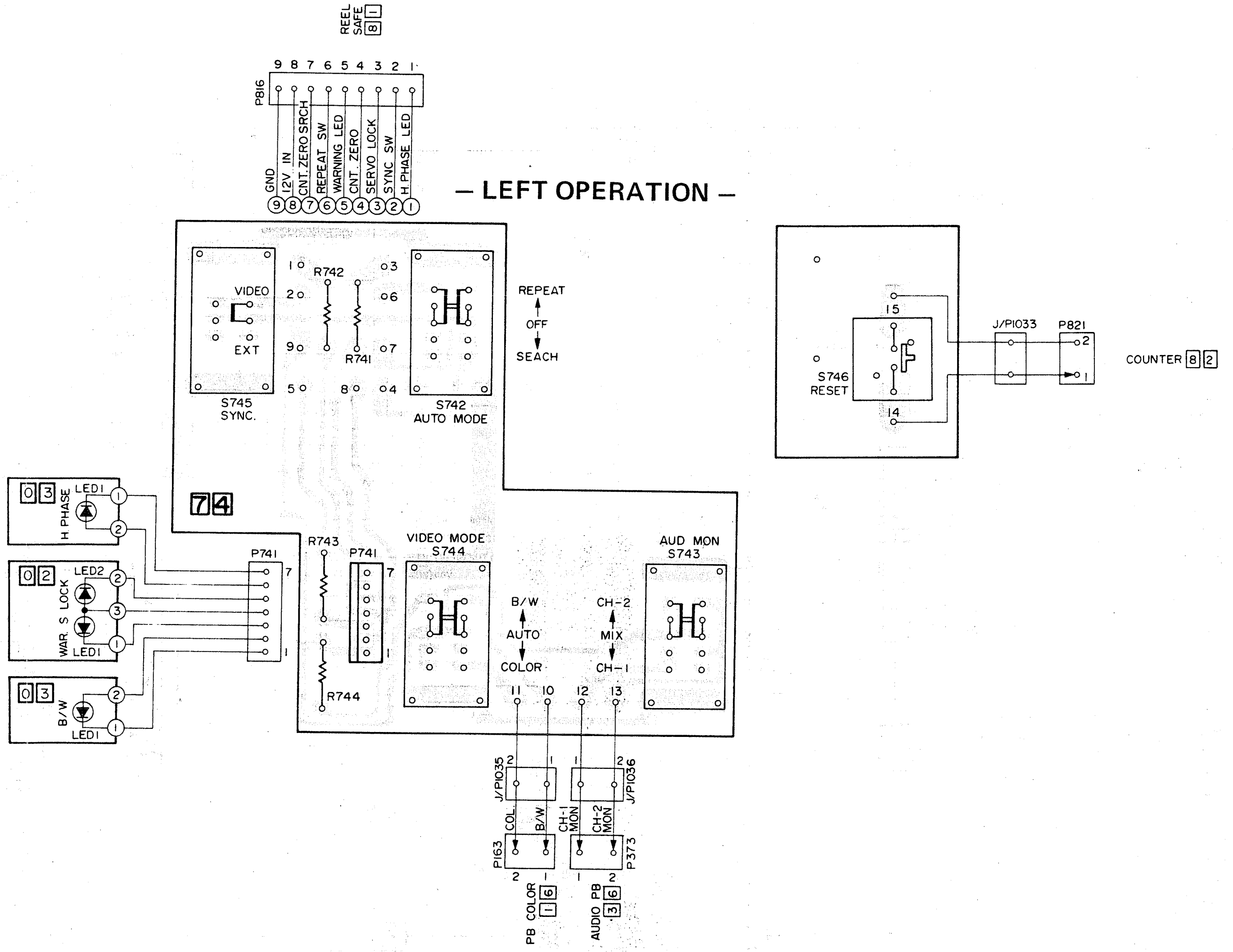


C4
DA7
CN10
DA4
DA3
CN4
CN3
CN2
CN1
DA1
DA2
DA8
DA6
DA5
DA14
DA21
DA11
CN8
CN7
CN6
CN5
Q1
R1
D2
C3
C2
R2
DA10
R3
Q2
DA16
D1
R6
DA9
DN13
B1
B2
B3
1000
CN9
D3
R5
C1
DA15

INDICATION

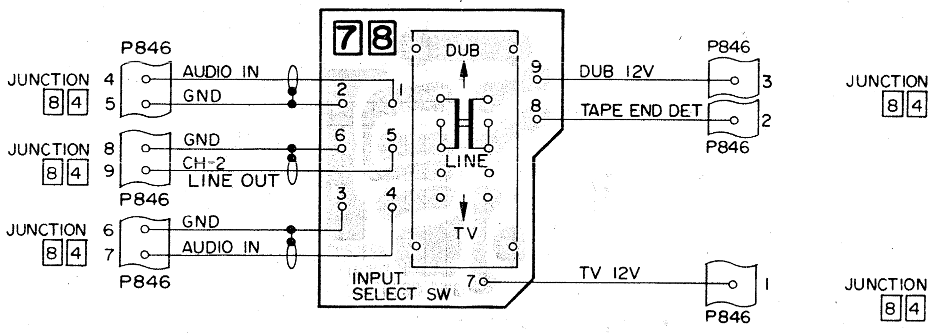
CN 1	P861
CN 2	P862
CN 3	P863
CN 4	P864
CN 5	P865
CN 6	P866
CN 7	P867
CN 8	P868
CN 9	P869
CN10	P870

– LEFT OPERATION –



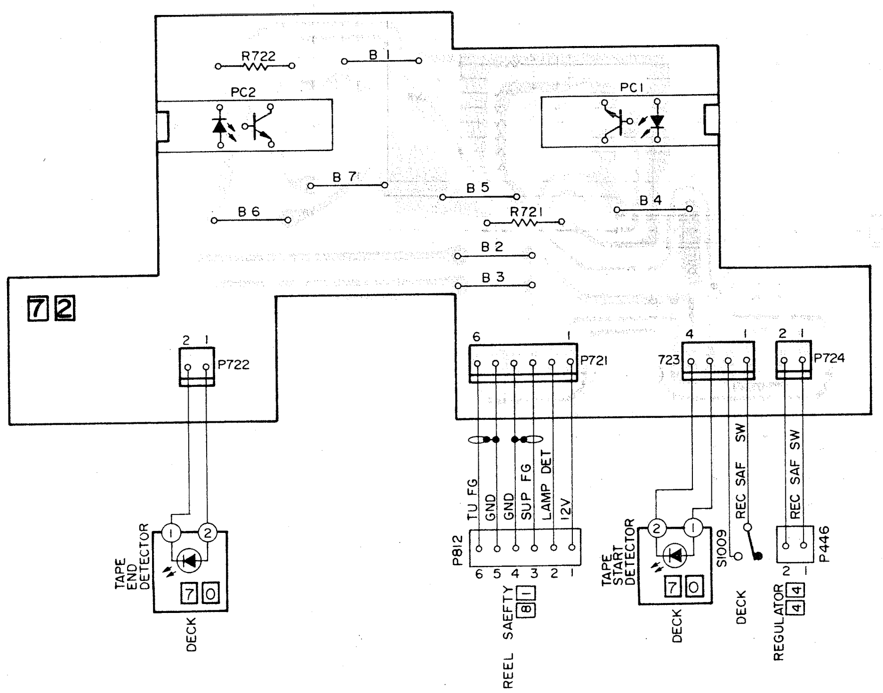
REEL SAFE 81
P816
GND
12V IN
CNT ZERO SRCH
REPEAT SW
WARNING LED
CNT ZERO
SERVO LOCK
SYNC SW
H PHASE LED
VIDEO
EXT
S745 SYNC.
R742
R741
S742 AUTO MODE
REPEAT
OFF
SEACH
S746 RESET
J/P1033
P821
COUNTER 82
74
03 LED1 H PHASE
02 LED2 WAR S LOCK LED1
03 B/W LED1
P741
R743
R744
VIDEO MODE S744
B/W AUTO COLOR
AUD MON S743
CH-2 MIX CH-1
J/P1035
J/P1036
P163
P373
COL
B/W
CH-1 MON
CH-2 MON
PB COLOR 16
AUDIO PB 36

– INPUT SELECT –



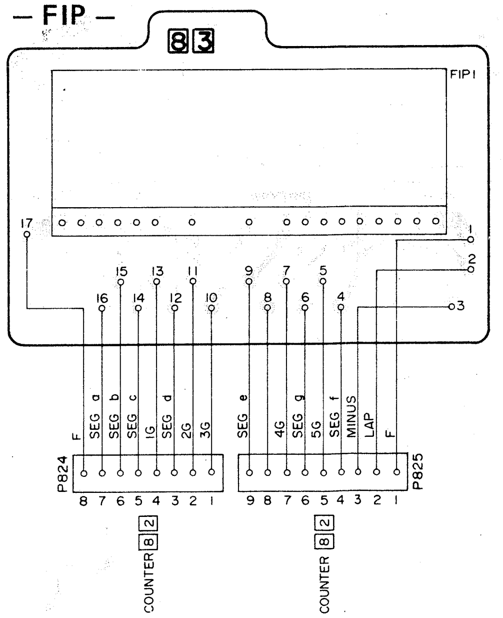
78
P846
JUNCTION 84
AUDIO IN
GND
CH-2
LINE OUT
DUB
LINE
TV
INPUT SELECT SW
DUB 12V
TAPE END DET
TV 12V

– REEL FG –



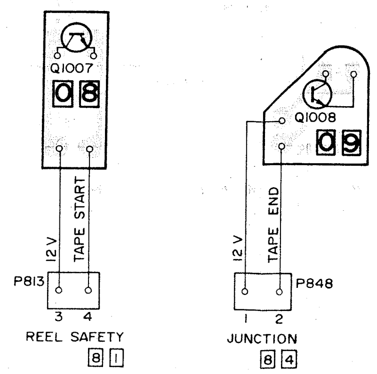
R722
B1
PC2
PC1
B7
B5
B4
B6
R721
B2
B3
72
P722
P721
723
P724
TAPE END DETECTOR 70
DECK
TU FG
GND
GND
SUP FG
LAMP DET
12V
P812
REEL SAFETY 81
TAPE START DETECTOR 70
S1009
REC SAF SW
DECK
REGULATOR 44
P446

– FIP –



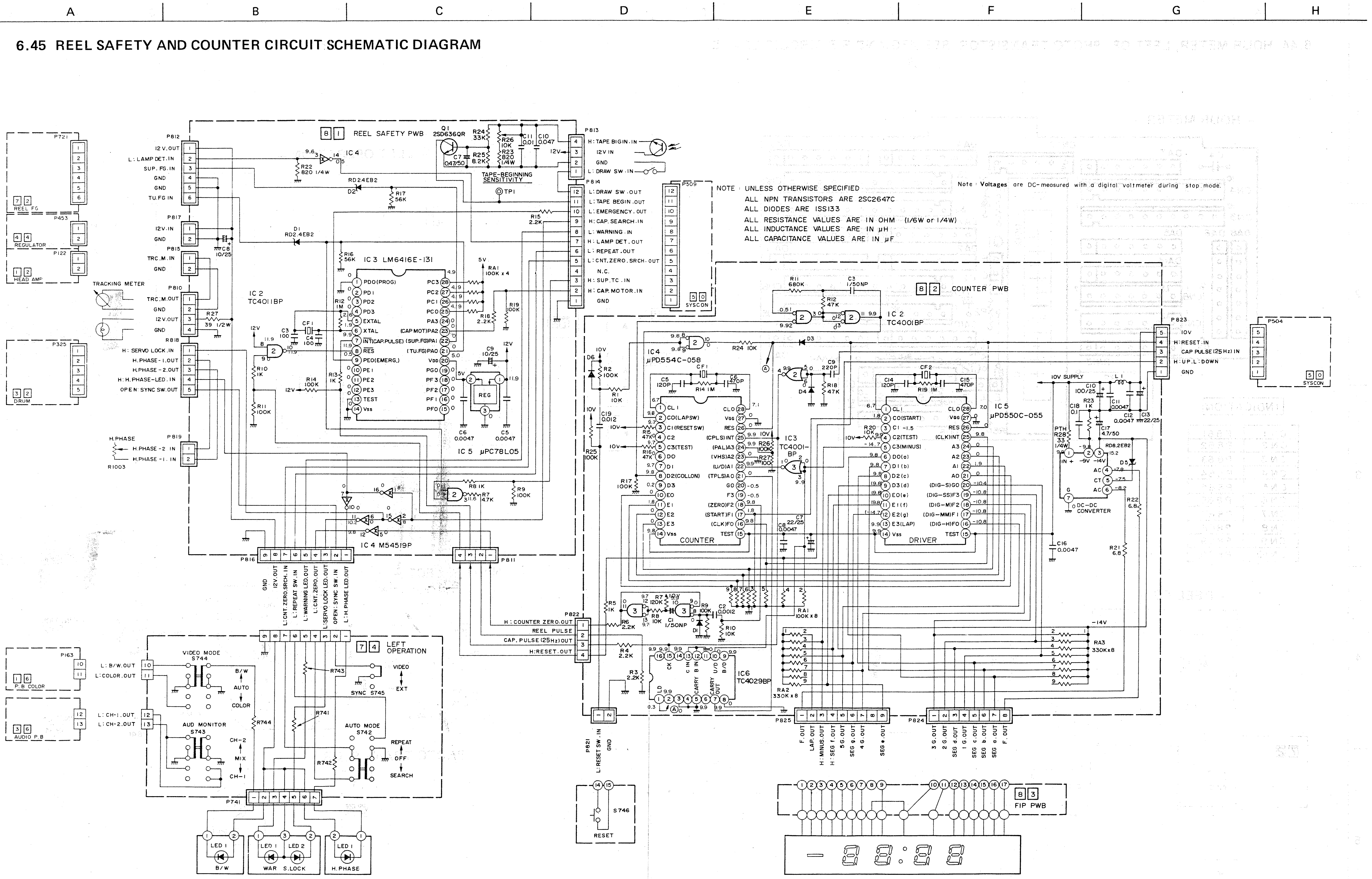
83
FIP1
F
SEG a
SEG b
SEG c
1G
SEG d
2G
3G
SEG e
4G
SEG g
5G
SEG f
MINUS
LAP
P824
P825
COUNTER 82
COUNTER 82

– PHOTO TRANSISTOR –



Q1007
08
Q1008
09
12V
TAPE START
P813
REEL SAFETY 81
12V
TAPE END
P848
JUNCTION 84

6.45 REEL SAFETY AND COUNTER CIRCUIT SCHEMATIC DIAGRAM

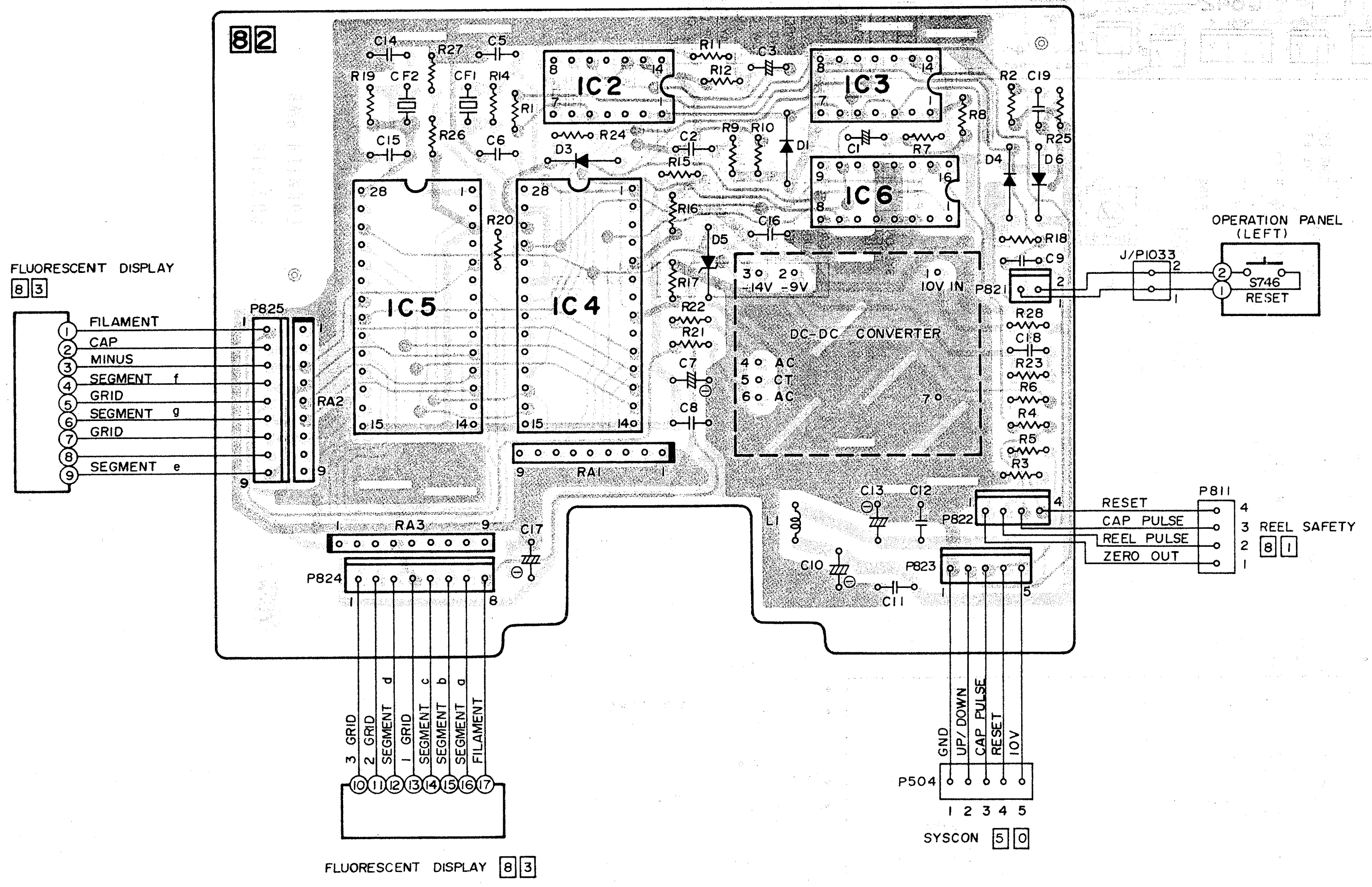

A
B
C
D
E
F
G
H
1
2
3
4
5
6
8 1 REEL SAFETY PWB
8 2 COUNTER PWB
8 3 FIP PWB
7 4 LEFT OPERATION
P721
7 2 REEL FG
P453
4 4 REGULATOR
P122
1 2 HEAD AMP
TRACKING METER
P325
3 2 DRUM
P163
1 6 P.B COLOR
3 6 AUDIO P.B
P812
12 V.OUT
L: LAMP DET. IN
SUP. FG. IN
GND
TU.FG IN
P817
12V. IN
P815
TRC. M. IN
P810
TRC. M. OUT
12 V. OUT
R27 39 1/2W
P818
H: SERVO LOCK. IN
H. PHASE - 1. OUT
H. PHASE - 2. OUT
H: H. PHASE-LED. IN
OPEN: SYNC SW. OUT
H. PHASE
P819
H. PHASE - 2 IN
H. PHASE - 1. IN
R1003
IC 2 TC4011BP
IC 4
IC3 LM6416E-131
IC 5 μPC78L05
IC 4 M54519P
Q1 2SD636QR
R24 33K
R26 10K
R25 8.2K
R23 820 1/4W
C11 0.01
C10 0.047
C7 047/50
TAPE-BEGINNING SENSITIVITY
TP1
R22 820 1/4W
RD24EB2
D2
R17 56K
R15 2.2K
D1 RD2.4EB2
R16 56K
RA1 100K x 4
R19 100K
R18 2.2K
C8 10/25
CF1
C3 100
C4 100
R12 1M
R10 1K
R11 100K
R14 100K
R13 1K
C9 10/25
REG
C6 0.0047
C5 0.0047
R8 1K
R9 100K
R7 4.7K
PD0 (PROG)
PD1
PD2
PD3
EXTAL
XTAL
INT (CAP.PULSE)
RES
PE0 (EMERG.)
PE1
PE2
PE3
TEST
Vss
PC3
PC2
PC1
PC0
(CAP MOT) PA3
(SUP. FG) PA2
(TU-FG) PA1
PA0
VDD
PG0
PF3
PF2
PF1
PF0
P813
H: TAPE BIGIN. IN
12V IN
GND
L: DRAW SW. IN
P814
L: DRAW SW. OUT
L: TAPE BEGIN. OUT
L: EMERGENCY. OUT
H: CAP. SEARCH. IN
L: WARNING. IN
H: LAMP DET. OUT
L: REPEAT. OUT
L: CNT. ZERO. SRCH. OUT
N.C.
H: SUP. TC. IN
H: CAP. MOTOR. IN
GND
P509
5 0 SYSCON
P816
GND
12V. OUT
L: CNT. ZERO. SRCH. IN
L: REPEAT SW. IN
L: WARNING LED. OUT
L: CNT. ZERO. OUT
L: SERVO LOCK LED. OUT
OPEN: SYNC SW. IN
L: H. PHASE LED. OUT
P811
L: B/W. OUT
L: COLOR. OUT
L: CH-1. OUT
L: CH-2. OUT
VIDEO MODE S744
B/W
AUTO
COLOR
AUD MONITOR S743
CH-2
MIX
CH-1
R743
VIDEO
EXT
SYNC S745
R744
R741
AUTO MODE S742
REPEAT
OFF
SEARCH
R742
P741
LED 1
LED 2
B/W
WAR
S.LOCK
H. PHASE
P822
H: COUNTER ZERO. OUT
REEL PULSE
CAP. PULSE (25Hz) OUT
H: RESET. OUT
P821
L: RESET SW. IN
GND
S746
RESET
IC4 μPD554C-058
COUNTER
CL1
C0 (LAPSW)
C1 (RESET SW)
C2
C3 (TEST)
D0
D1
D2 (COLLON)
D3
E0
E1
E2
E3
Vss
CL0
VGG
RES
(CPLS) INT
(PAL) A3
(VHS) A2
(U/D) A1
(TPLS) A0
G0
F3
(ZERO) F2
(START) F1
(CLK) F0
TEST
R11 680K
C3 1/50NP
R12 47K
IC 2 TC4001BP
R24 10K
D3
D6
R2 100K
R1 10K
C19 0.012
R25 100K
R5 47K
R16 47K
R17 100K
C5 120P
C6 470P
R14 1M
R26 100K
R27 100K
C9 220P
R18 47K
D4
IC3 TC4001-BP
C7 22/25
C8 0.0047
IC 5 μPD550C-055
DRIVER
C0 (START)
C1
C2 (TEST)
C3 (MINUS)
D0 (a)
D1 (b)
D2 (c)
D3 (d)
E0 (e)
E1 (f)
E2 (g)
E3 (LAP)
(CLK) INT
A3
A2
A1
A0
(DIG-S) G0
(DIG-SS) F3
(DIG-M) F2
(DIG-MM) F1
(DIG-H) F0
C14 120P
C15 470P
R19 1M
R20 10K
CF2
10V SUPPLY
L1
C10 100/25
C11 0.0047
C12 0.0047
C13 22/25
C18 0.1
R23 1K
PTH R28 33 1/4W
C17 47/50
RD8.2EB2
D5
IN
AC
CT
DC-DC CONVERTER
R22 6.8
R21 6.8
C16 0.0047
P823
10V
H: RESET. IN
CAP PULSE (25Hz) IN
H: U.P. L: DOWN
GND
P504
5 0 SYSCON
R5 1K
R6 2.2K
R4 2.2K
R3 2.2K
R7 120K
R8 10K
C1 1/50NP
R9 100K
C2 0.0012
R10 10K
D1
IC6 TC4029BP
CK
C IN
CARRY B IN
U/D
B/D
LD
CARRY OUT
RA1 100K x 8
RA2 330K x 8
RA3 330K x 8
-14V
P825
P824
F. OUT
LAP. OUT
H: MINUS. OUT
H: SEG 1. OUT
5 G. OUT
SEG g. OUT
4 G. OUT
SEG e. OUT
3 G. OUT
2 G. OUT
SEG d. OUT
1 G. OUT
SEG c. OUT
SEG b. OUT
SEG a. OUT
F. OUT

NOTE : UNLESS OTHERWISE SPECIFIED
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE ISS133
ALL RESISTANCE VALUES ARE IN OHM (1/6W or 1/4W)
ALL INDUCTANCE VALUES ARE IN μH
ALL CAPACITANCE VALUES ARE IN μF

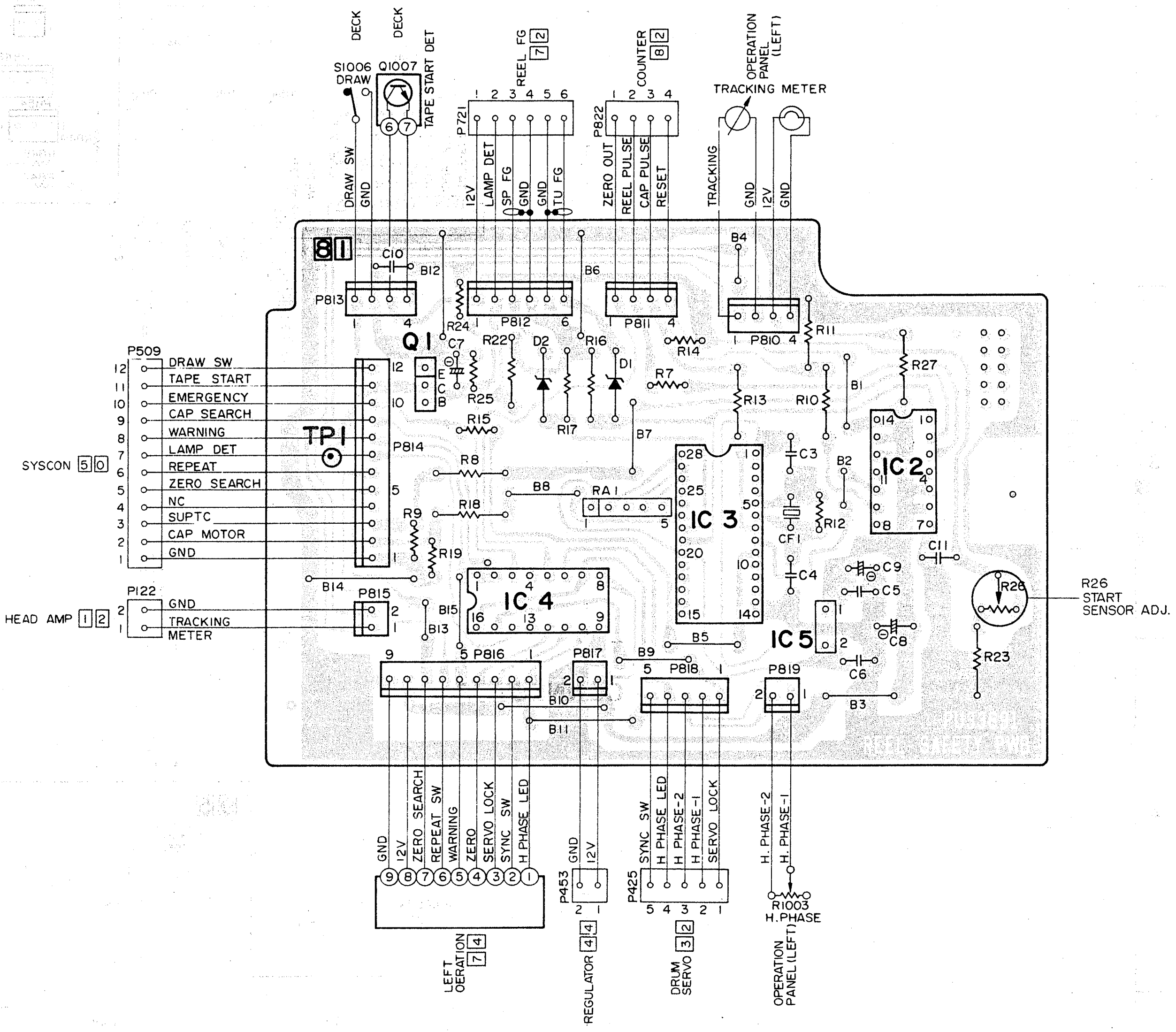
Note : Voltages are DC-measured with a digital voltmeter during stop mode.

6.46 REEL SAFETY AND COUNTER CIRCUIT BOARD

— COUNTER —

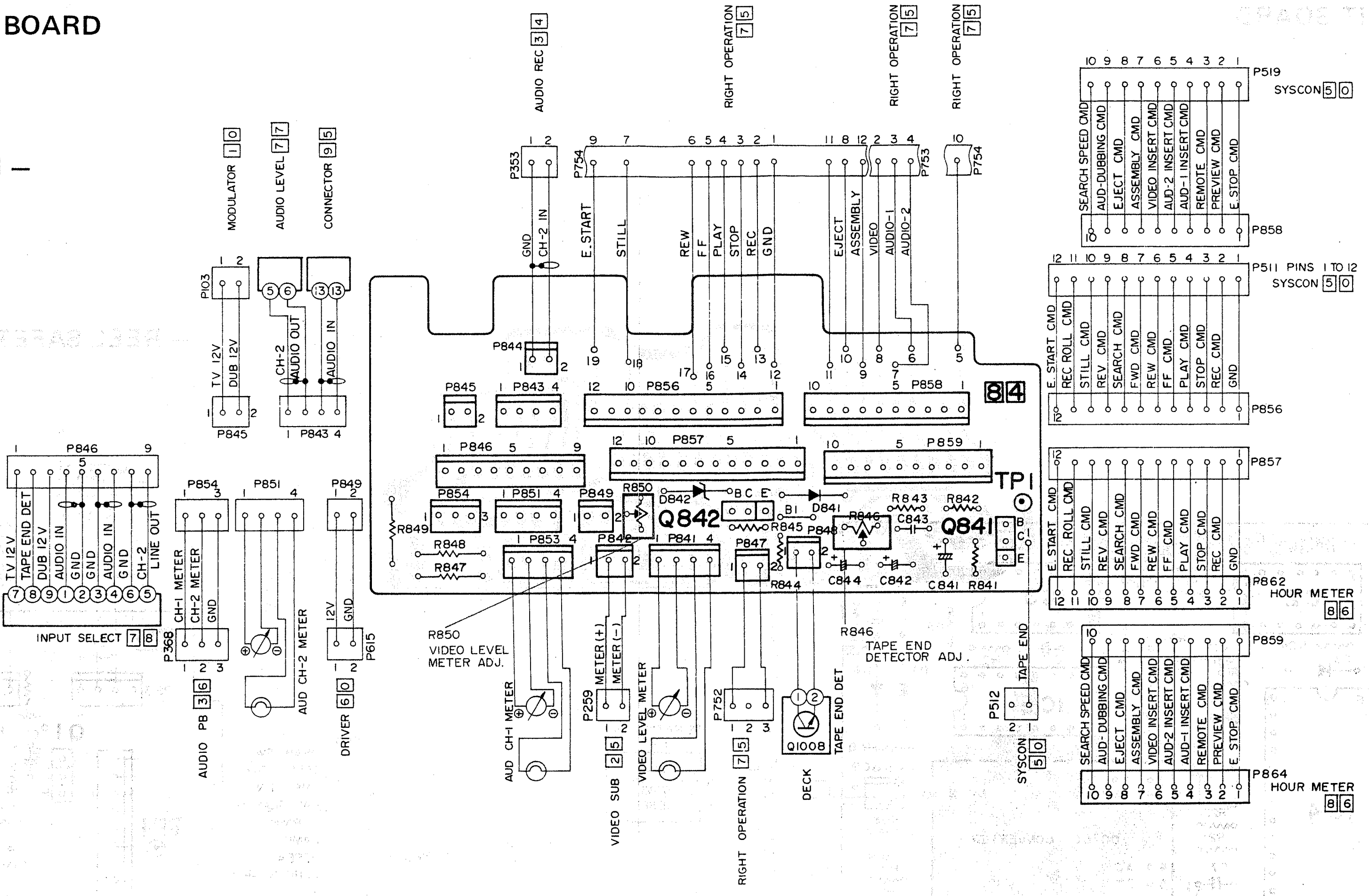

82
FLUORESCENT DISPLAY 83
FILAMENT
CAP
MINUS
SEGMENT f
GRID
SEGMENT g
GRID
SEGMENT e
P825
RA2
IC5
IC4
IC2
IC3
IC6
RA1
RA3
P824
DC-DC CONVERTER
10V IN
-14V -9V
AC
CT
AC
P821
P822
P823
J/P1033
OPERATION PANEL (LEFT)
S746
RESET
P811
RESET
CAP PULSE
REEL PULSE
ZERO OUT
REEL SAFETY 81
3 GRID
2 GRID
SEGMENT d
1 GRID
SEGMENT c
SEGMENT b
SEGMENT a
FILAMENT
FLUORESCENT DISPLAY 83
GND
UP/DOWN
CAP PULSE
RESET
10V
P504
SYSCON 50

— REEL SAFETY —

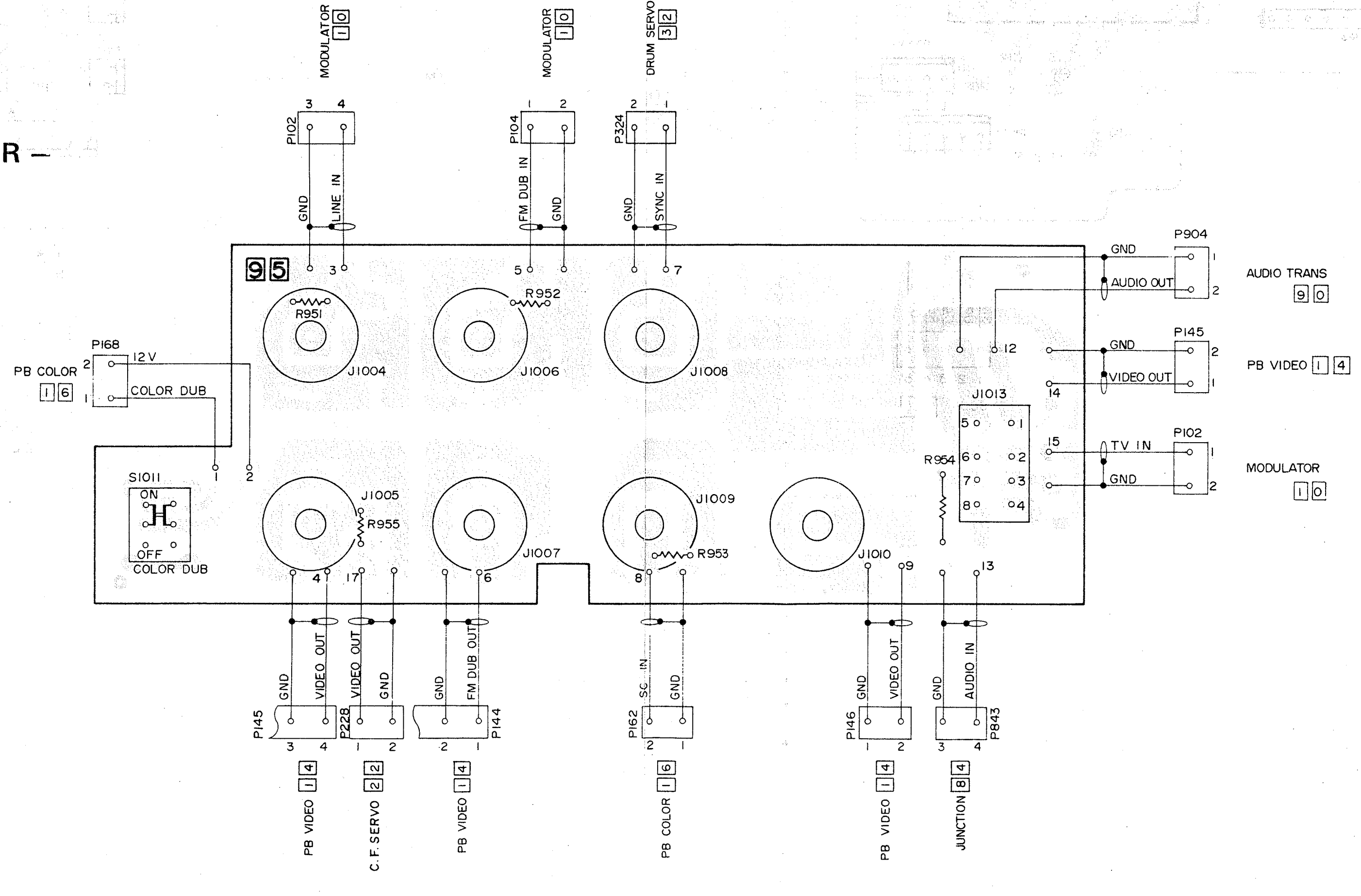

DECK
S1006 DRAW
DECK
Q1007 TAPE START DET
P721
REEL FG 72
LAMP DET
SP FG
TU FG
COUNTER 82
P822
ZERO OUT
REEL PULSE
CAP PULSE
RESET
OPERATION PANEL (LEFT)
TRACKING METER
TRACKING
81
P813
P812
P811
P810
Q1
TP1
P509
DRAW SW
TAPE START
EMERGENCY
CAP SEARCH
WARNING
LAMP DET
REPEAT
ZERO SEARCH
NC
SUPTC
CAP MOTOR
GND
SYSCON 50
P814
P122
HEAD AMP 12
GND
TRACKING
METER
P815
IC4
IC3
IC2
IC5
RA1
P816
P817
P818
P819
R26 START SENSOR ADJ.
GND
12V
ZERO SEARCH
REPEAT SW
WARNING
ZERO
SERVO LOCK
SYNC SW
H PHASE LED
LEFT OPERATION 74
P453
REGULATOR 44
P425
SYNC SW
H PHASE LED
H PHASE-2
H PHASE-1
SERVO LOCK
DRUM SERVO 32
H. PHASE-2
H. PHASE-1
R1003 H.PHASE
OPERATION PANEL (LEFT)

6.47 CONNECTOR AND JUNCTION CIRCUIT BOARD

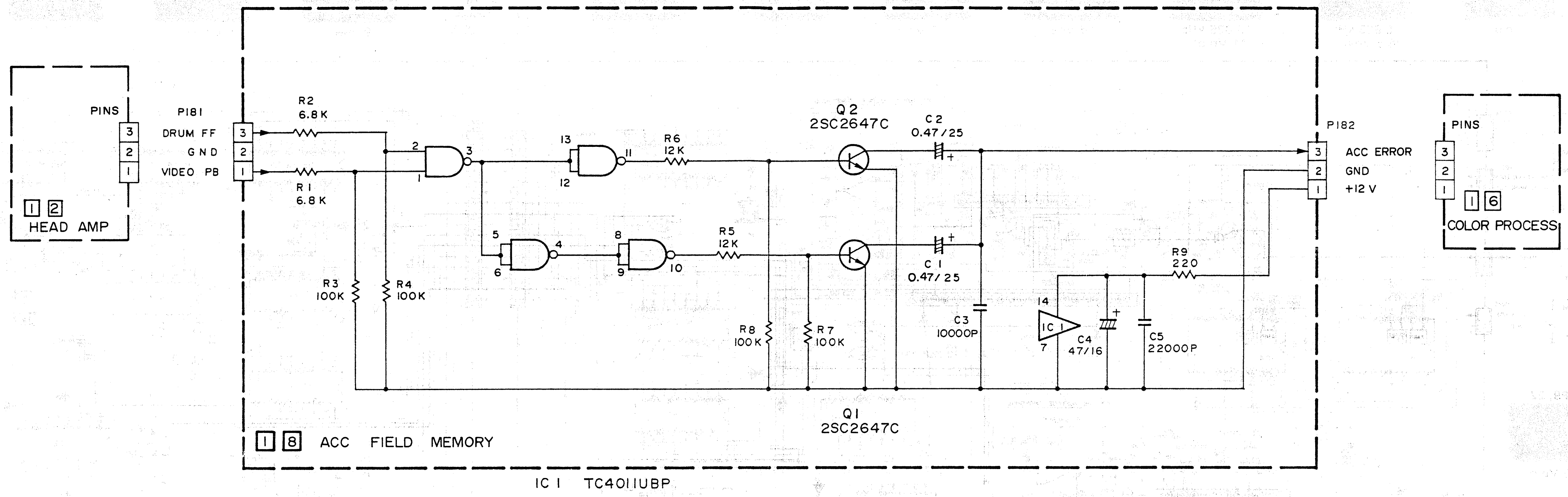
– JUNCTION –

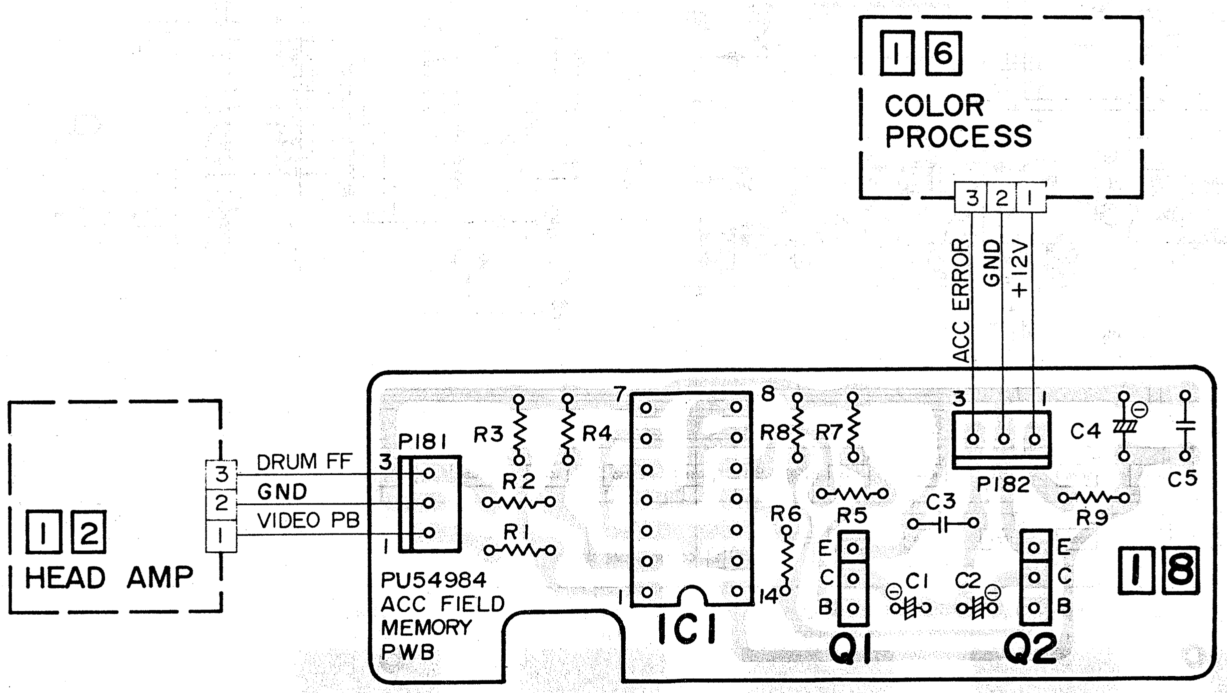

AUDIO REC 3 4
RIGHT OPERATION 7 5
RIGHT OPERATION 7 5
RIGHT OPERATION 7 5
MODULATOR 1 0
AUDIO LEVEL 7 7
CONNECTOR 9 5
P103
TV 12V
DUB 12V
P845
CH-2 AUDIO OUT
AUDIO IN
P843
P353
GND
CH-2 IN
P754
E. START
STILL
REW
F.F
PLAY
STOP
REC
GND
EJECT
ASSEMBLY
VIDEO
AUDIO-1
AUDIO-2
P753
P754
P844
P856
P858
84
P846
P857
P859
TP1
P854
P851
P849
R850
D842
Q842
B C E
D841
R846
R843
R842
C843
Q841
R849
R848
R847
P853
P848
P841
P847
R845
R844
C844
C842
C841
R841
T.V 12V
TAPE END DET
DUB 12V
AUDIO IN
GND
GND
AUDIO IN
GND
CH-2 LINE OUT
INPUT SELECT 7 8
CH-1 METER
CH-2 METER
GND
P368
AUDIO PB 3 6
AUD CH-2 METER
12V
GND
P615
DRIVER 6 0
R850 VIDEO LEVEL METER ADJ.
AUD CH-1 METER
P259
METER(+)
METER(−)
VIDEO SUB 2 5
VIDEO LEVEL METER
P752
RIGHT OPERATION 7 5
Q1008
DECK
TAPE END DET
R846 TAPE END DETECTOR ADJ.
P512
TAPE END
SYSCON 5 0
P519
SYSCON 5 0
SEARCH SPEED CMD
AUD-DUBBING CMD
EJECT CMD
ASSEMBLY CMD
VIDEO INSERT CMD
AUD-2 INSERT CMD
AUD-1 INSERT CMD
REMOTE CMD
PREVIEW CMD
E. STOP CMD
P858
P511 PINS 1 TO 12
SYSCON 5 0
E. START CMD
REC ROLL CMD
STILL CMD
REV CMD
SEARCH CMD
FWD CMD
REW CMD
FF CMD
PLAY CMD
STOP CMD
REC CMD
GND
P856
P857
P862
HOUR METER 8 6
P859
P864
HOUR METER 8 6

– CONNECTOR –

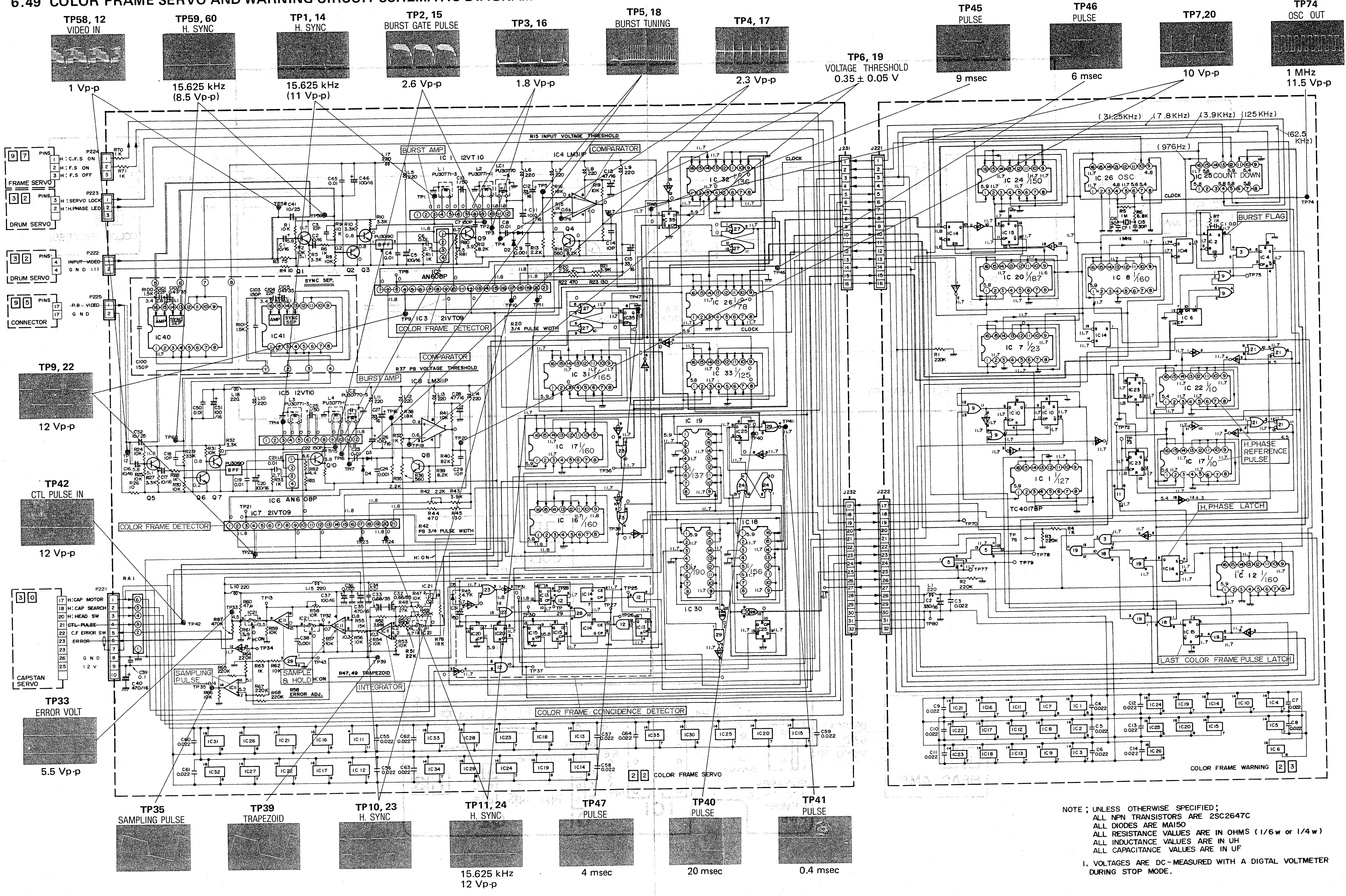

MODULATOR 1 0
MODULATOR 1 0
DRUM SERVO 3 2
P102
GND
LINE IN
P104
FM DUB IN
GND
P324
GND
SYNC IN
95
R951
J1004
R952
J1006
J1008
P168
PB COLOR 1 6
12V
COLOR DUB
S1011
ON
OFF
COLOR DUB
J1005
R955
J1007
J1009
R953
J1010
J1013
R954
GND
AUDIO OUT
P904
AUDIO TRANS 9 0
GND
VIDEO OUT
P145
PB VIDEO 1 4
TV IN
GND
P102
MODULATOR 1 0
P145
GND
VIDEO OUT
P228
VIDEO OUT
GND
GND
FM DUB OUT
P144
P162
SC IN
GND
P146
GND
VIDEO OUT
GND
AUDIO IN
P843
PB VIDEO 1 4
C.F. SERVO 2 2
PB VIDEO 1 4
PB COLOR 1 6
PB VIDEO 1 4
JUNCTION 8 4

6.48 ACC FIELD MEMORY CIRCUIT SCHEMATIC DIAGRAM AND CIRCUIT BOARD


PINS
3
2
1
1 2
HEAD AMP
P181
DRUM FF
GND
VIDEO PB
R2
6.8K
R1
6.8K
R3
100K
R4
100K
2
1
3
5
6
4
13
12
11
8
9
10
R6
12K
R5
12K
Q2
2SC2647C
C2
0.47/25
C1
0.47/25
C3
10000P
R8
100K
R7
100K
14
IC 1
7
C4
47/16
C5
22000P
R9
220
P182
ACC ERROR
GND
+12 V
PINS
1 6
COLOR PROCESS
Q1
2SC2647C
1 8 ACC FIELD MEMORY
IC 1 TC4011UBP


1 6
COLOR PROCESS
3 2 1
ACC ERROR
GND
+12V
1 2
HEAD AMP
3
2
1
DRUM FF
GND
VIDEO PB
P181
R3
R4
R2
R1
PU54984
ACC FIELD
MEMORY
PWB
7
8
1
14
IC1
R8
R7
R6
R5
E
C
B
C1
C2
Q1
C3
P182
C4
C5
R9
Q2
1 8

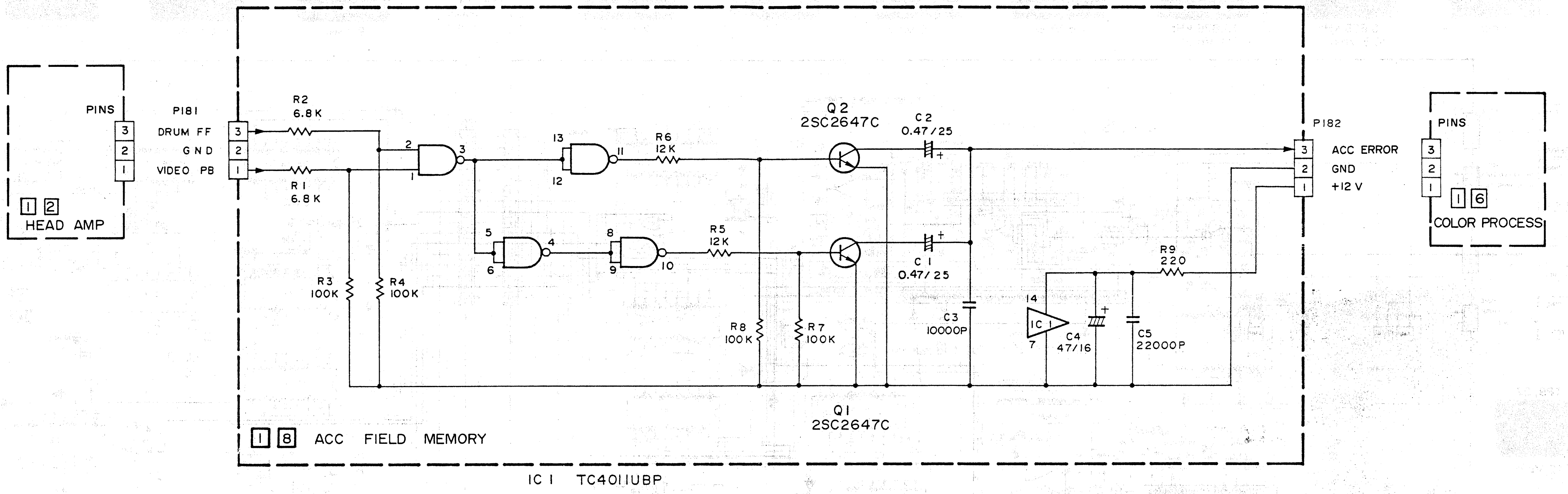
6.49 COLOR FRAME SERVO AND WARNING CIRCUIT SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TP58, 12
VIDEO IN
1 Vp-p
TP59, 60
H. SYNC
15.625 kHz
(8.5 Vp-p)
TP1, 14
H. SYNC
15.625 kHz
(11 Vp-p)
TP2, 15
BURST GATE PULSE
2.6 Vp-p
TP3, 16
1.8 Vp-p
TP5, 18
BURST TUNING
TP4, 17
2.3 Vp-p
TP6, 19
VOLTAGE THRESHOLD
0.35 ± 0.05 V
TP45
PULSE
9 msec
TP46
PULSE
6 msec
TP7,20
10 Vp-p
TP74
OSC OUT
1 MHz
11.5 Vp-p
TP9, 22
12 Vp-p
TP42
CTL PULSE IN
12 Vp-p
TP33
ERROR VOLT
5.5 Vp-p
TP35
SAMPLING PULSE
TP39
TRAPEZOID
TP10, 23
H. SYNC
TP11, 24
H. SYNC
15.625 kHz
12 Vp-p
TP47
PULSE
4 msec
TP40
PULSE
20 msec
TP41
PULSE
0.4 msec
FRAME SERVO
DRUM SERVO
CONNECTOR
CAPSTAN SERVO
BURST AMP
COMPARATOR
COLOR FRAME DETECTOR
SYNC SEP.
R15 INPUT VOLTAGE THRESHOLD
R37 PB VOLTAGE THRESHOLD
R20 3/4 PULSE WIDTH
R42 PB 3/4 PULSE WIDTH
SAMPLING PULSE
SAMPLE & HOLD
INTEGRATOR
R47,49 TRAPEZOID
R58 ERROR ADJ.
COLOR FRAME COINCIDENCE DETECTOR
COLOR FRAME SERVO
IC 26 OSC
IC 25 COUNT DOWN
BURST FLAG
H.PHASE REFERENCE PULSE
H.PHASE LATCH
LAST COLOR FRAME PULSE LATCH
COLOR FRAME WARNING
(31.25KHz)
(7.8KHz)
(3.9KHz)
(125KHz)
(62.5 KHz)
(976Hz)
J231
J221
J232
J222

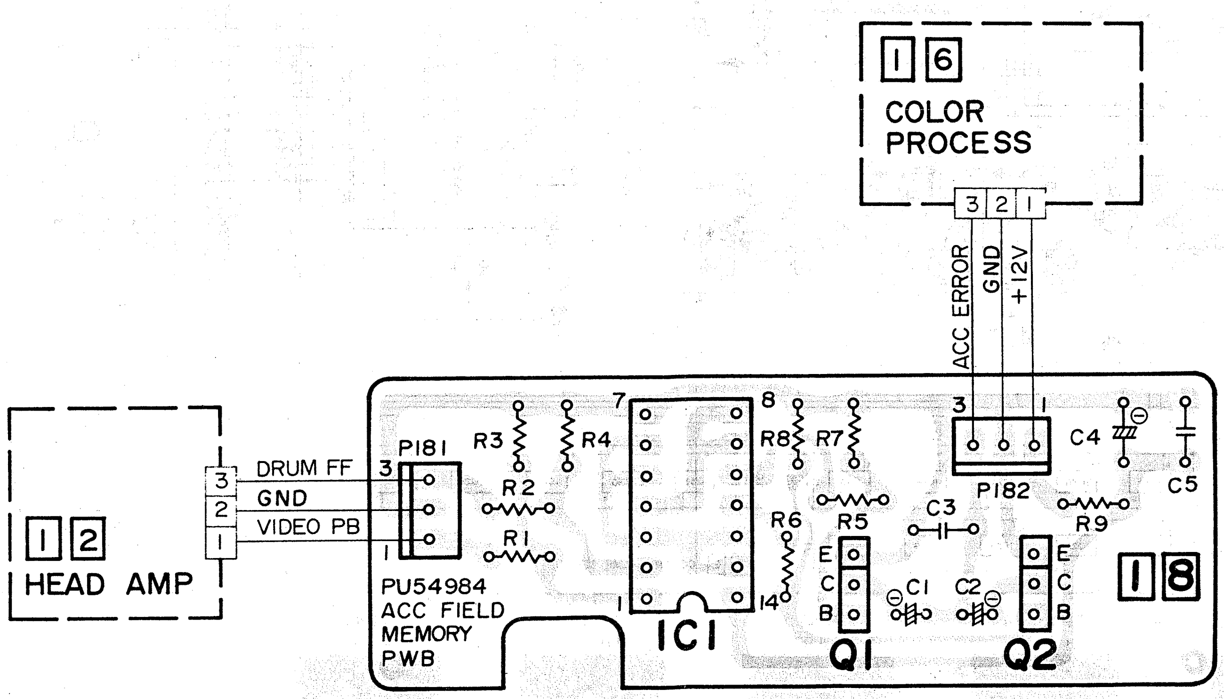
NOTE ; UNLESS OTHERWISE SPECIFIED;
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE MA150
ALL RESISTANCE VALUES ARE IN OHMS (1/6w or 1/4w)
ALL INDUCTANCE VALUES ARE IN UH
ALL CAPACITANCE VALUES ARE IN UF

1. VOLTAGES ARE DC-MEASURED WITH A DIGTAL VOLTMETER DURING STOP MODE.

6.48 ACC FIELD MEMORY CIRCUIT SCHEMATIC DIAGRAM AND CIRCUIT BOARD

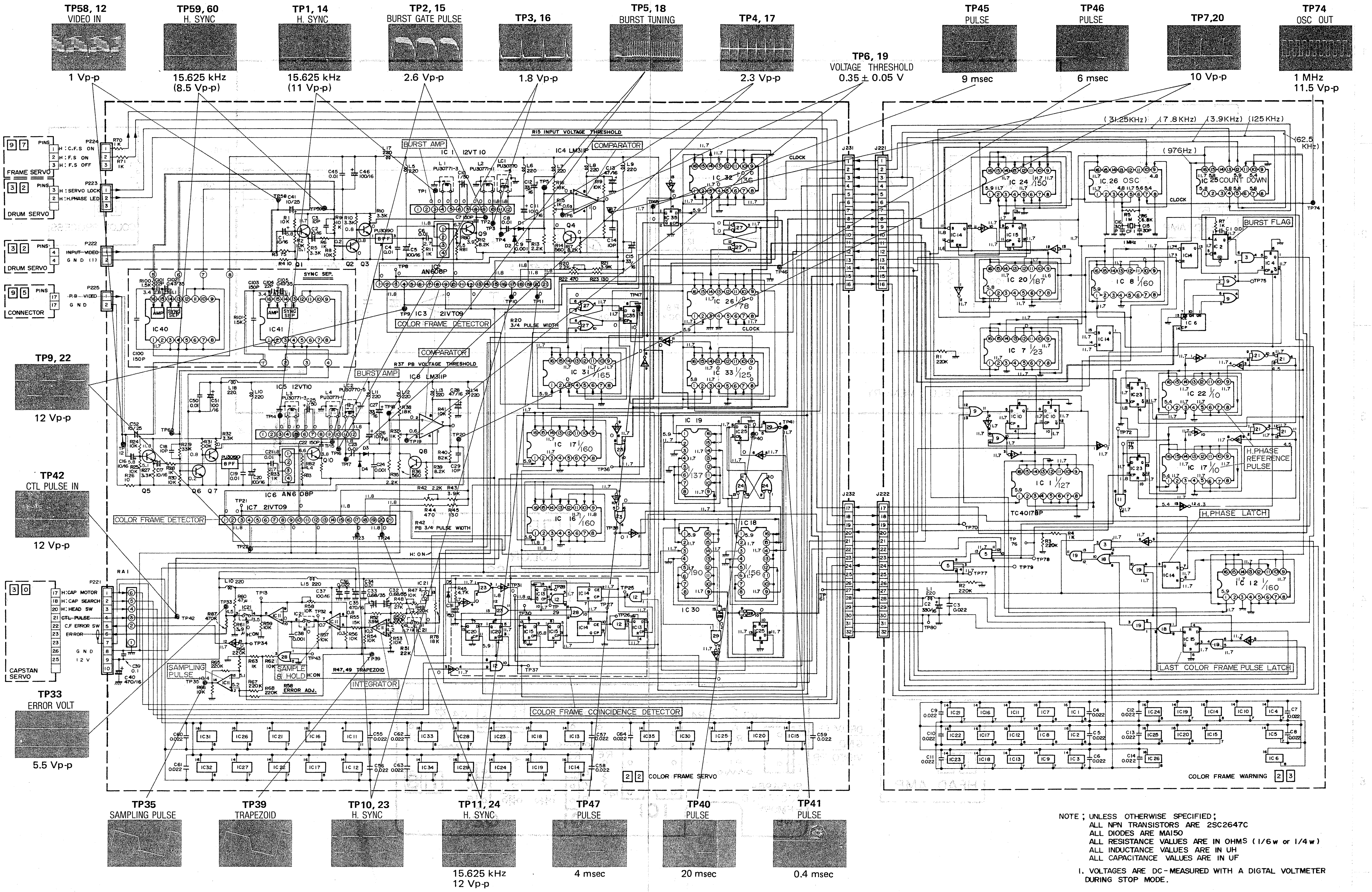


PINS
3
2
1
1 2
HEAD AMP
P181
DRUM FF
GND
VIDEO PB
R2
6.8K
R1
6.8K
R3
100K
R4
100K
13
12
11
R6
12K
5
6
4
8
9
10
R5
12K
Q2
2SC2647C
C2
0.47/25
C1
0.47/25
C3
10000P
R8
100K
R7
100K
14
IC1
7
C4
47/16
C5
22000P
R9
220
Q1
2SC2647C
P182
ACC ERROR
GND
+12 V
PINS
1 6
COLOR PROCESS
1 8 ACC FIELD MEMORY
IC1 TC4011UBP



1 6
COLOR PROCESS
3 2 1
ACC ERROR
GND
+12V
1 2
HEAD AMP
DRUM FF
GND
VIDEO PB
P181
R3
R4
R2
R1
7
8
R8
R7
R6
R5
1
14
IC1
E
C
B
Q1
C1
C2
C3
P182
Q2
C4
C5
R9
1 8
PU54984
ACC FIELD
MEMORY
PWB

6.49 COLOR FRAME SERVO AND WARNING CIRCUIT SCHEMATIC DIAGRAM

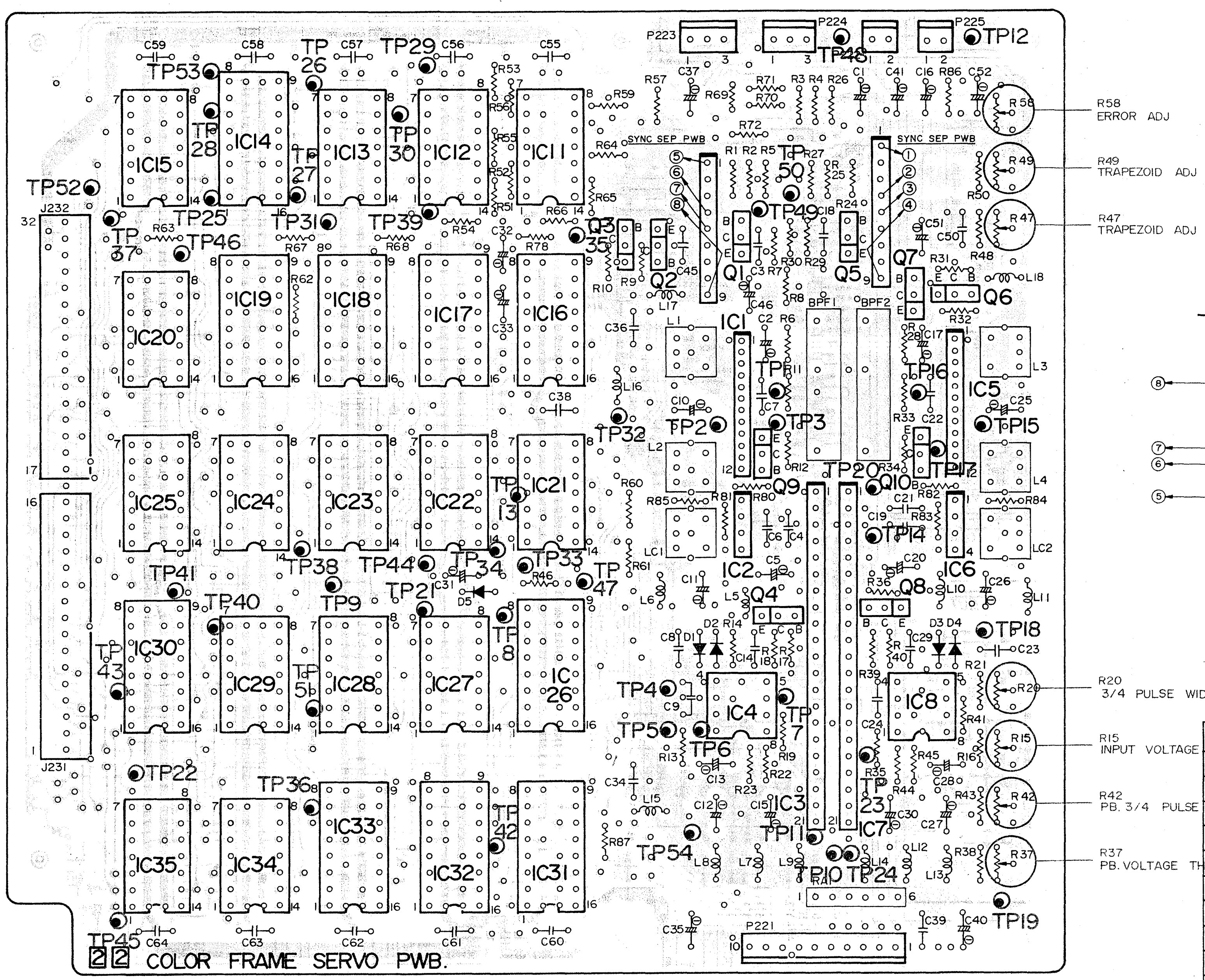

TP58, 12 VIDEO IN 1 Vp-p
TP59, 60 H. SYNC 15.625 kHz (8.5 Vp-p)
TP1, 14 H. SYNC 15.625 kHz (11 Vp-p)
TP2, 15 BURST GATE PULSE 2.6 Vp-p
TP3, 16 1.8 Vp-p
TP5, 18 BURST TUNING
TP4, 17 2.3 Vp-p
TP6, 19 VOLTAGE THRESHOLD 0.35 ± 0.05 V
TP45 PULSE 9 msec
TP46 PULSE 6 msec
TP7,20 10 Vp-p
TP74 OSC OUT 1 MHz 11.5 Vp-p
TP9, 22 12 Vp-p
TP42 CTL PULSE IN 12 Vp-p
TP33 ERROR VOLT 5.5 Vp-p
TP35 SAMPLING PULSE
TP39 TRAPEZOID
TP10, 23 H. SYNC
TP11, 24 H. SYNC 15.625 kHz 12 Vp-p
TP47 PULSE 4 msec
TP40 PULSE 20 msec
TP41 PULSE 0.4 msec
FRAME SERVO
DRUM SERVO
CONNECTOR
CAPSTAN SERVO
BURST AMP
COMPARATOR
SYNC SEP.
COLOR FRAME DETECTOR
SAMPLING PULSE
SAMPLE & HOLD
INTEGRATOR
COLOR FRAME COINCIDENCE DETECTOR
COLOR FRAME SERVO
BURST FLAG
H.PHASE REFERENCE PULSE
H.PHASE LATCH
LAST COLOR FRAME PULSE LATCH
COLOR FRAME WARNING
IC 26 OSC
IC 25 COUNT DOWN
TC4017BP
(31.25KHz) (7.8KHz) (3.9KHz) (125KHz) (62.5 KHz) (976Hz)

NOTE ; UNLESS OTHERWISE SPECIFIED ;
ALL NPN TRANSISTORS ARE 2SC2647C
ALL DIODES ARE MA150
ALL RESISTANCE VALUES ARE IN OHMS (1/6w or 1/4w)
ALL INDUCTANCE VALUES ARE IN UH
ALL CAPACITANCE VALUES ARE IN UF

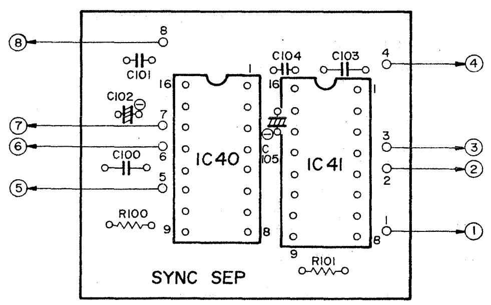
1. VOLTAGES ARE DC-MEASURED WITH A DIGTAL VOLTMETER DURING STOP MODE.

6.50 COLOR FRAME SERVO AND WARNING CIRCUIT BOARDS

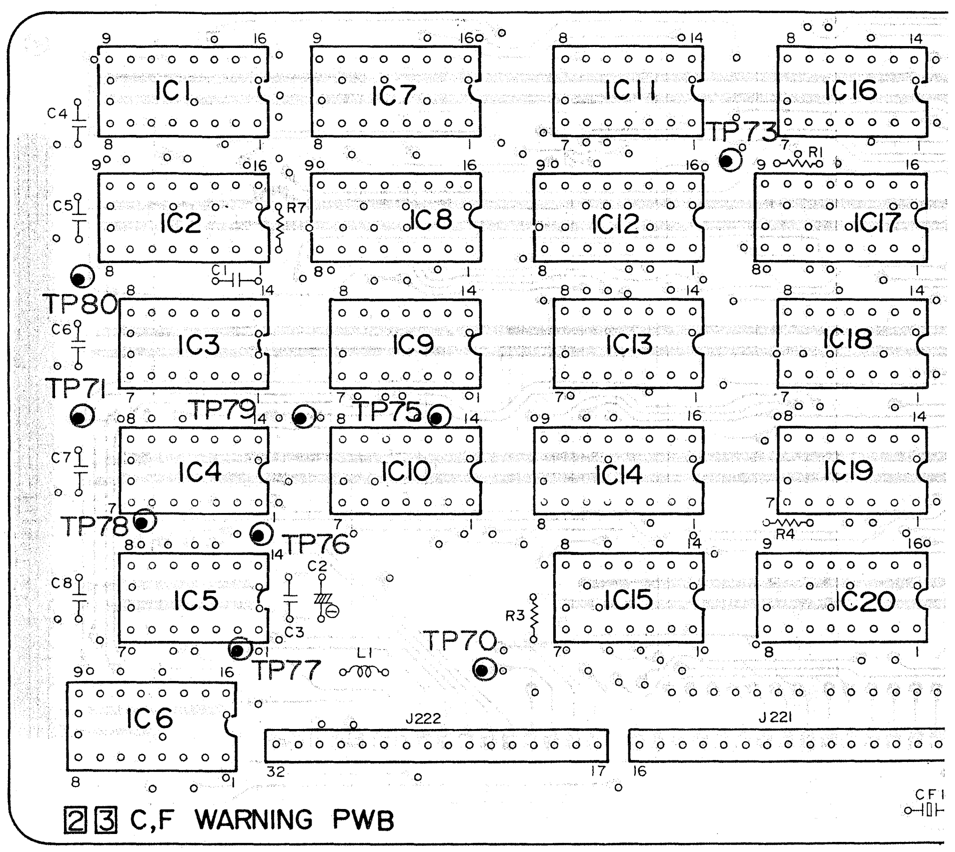
– SERVO BOARD –


22 COLOR FRAME SERVO PWB.
R58 ERROR ADJ
R49 TRAPEZOID ADJ
R47 TRAPEZOID ADJ
R20 3/4 PULSE WIDTH
R15 INPUT VOLTAGE THRESHOLD
R42 PB. 3/4 PULSE WIDTH
R37 PB. VOLTAGE THRESHOLD
P223
P224
P225
P221
J232
J231
SYNC SEP PWB
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
BPF1
BPF2
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
TP20
TP21
TP22
TP23
TP24
TP25
TP26
TP27
TP28
TP29
TP30
TP31
TP32
TP33
TP34
TP36
TP37
TP38
TP39
TP40
TP41
TP42
TP43
TP44
TP45
TP46
TP47
TP48
TP49
TP50
TP51
TP52
TP53
TP54

– SYNC SEP. BOARD –


SYNC SEP
IC40
IC41
C100
C101
C102
C103
C104
C105
R100
R101
①
②
③
④
⑤
⑥
⑦
⑧

– WARNING BOARD –

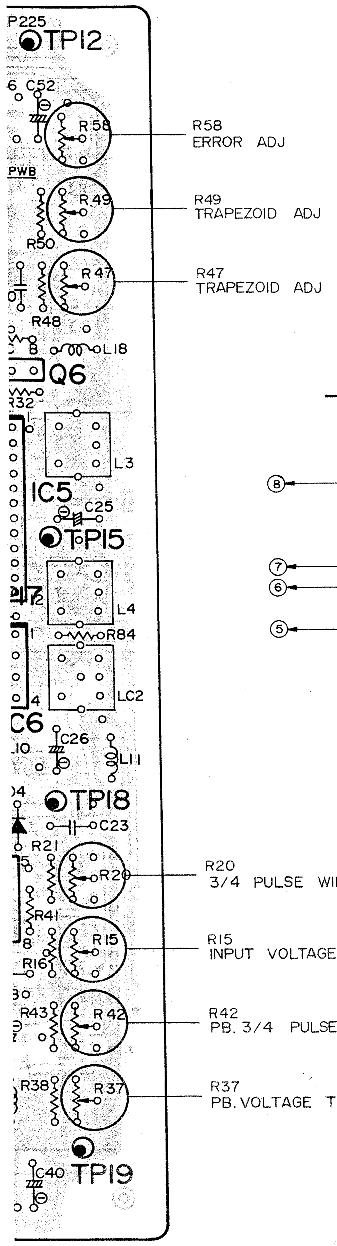

23 C,F WARNING PWB
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
J222
J221
TP70
TP71
TP73
TP75
TP76
TP77
TP78
TP79
TP80
CF1

COLOR FRAME SERVO

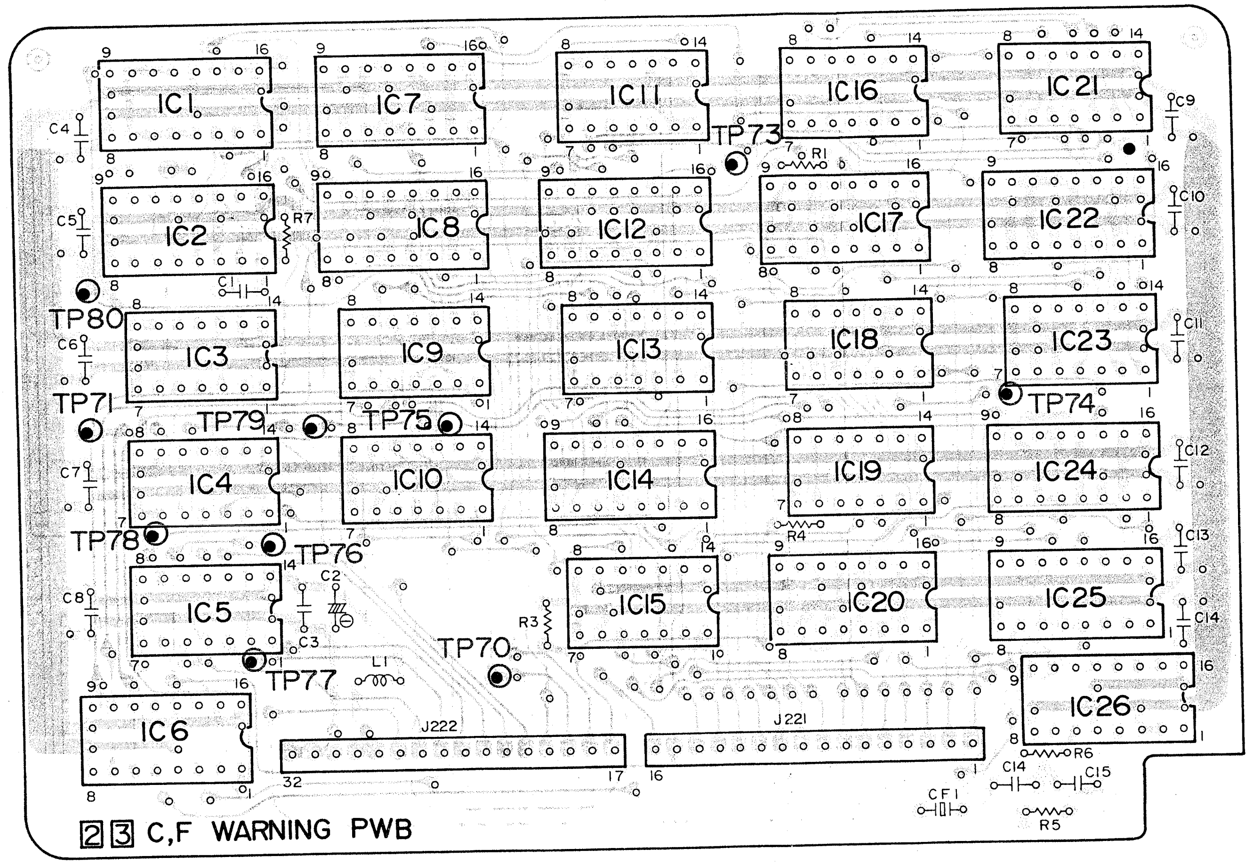
No.	NAME	No.	NAME
IC 1	12 VT10	IC 22	TC4069UBP
IC 2	AN608P	IC 23	TC4071BP
IC 3	21VT09	IC 24	TC4011BP
IC 4	LM311P	IC 25	TC4013BP
IC 5	12VT10	IC 26	TC40103BP
IC 6	AN608P	IC 27	TC4011BP
IC 7	21VT09	IC 28	TC4071BP
IC 8	LM311P	IC 29	TC4011BP
IC 11	TL094CN	IC 30	TC40103BP
IC 12	TC4081BP	IC 31	TC40103BP
IC 13	TC4013BP	IC 32	TC40103BP
IC 14	TC4518BP	IC 33	TC40103BP
IC 15	TC4013BP	IC 34	TC4069UBP
IC 16	TC40103BP	IC 35	TC4013BP
IC 17	TC40103BP		
IC 18	TC40103BP	IC 40	AN301
IC 19	TC40103BP	IC 41	AN301
IC 20	TC4013BP		
IC 21	TC4066BP		

COLOR FRAME WARING

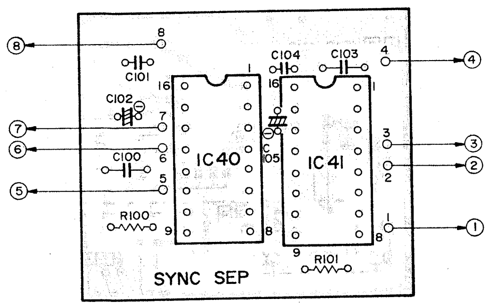
No.	NAME	No.	NAME
IC 1	TC40103BP	IC 14	TC4044BP
IC 2	TC4538BP	IC 15	TC4013BP
IC 3	TC4081BP	IC 16	TC4069UBP
IC 4	TC4013BP	IC 17	TC40103BP
IC 5	TC4082BP	IC 18	TC4071BP
IC 6	TC4017BP	IC 19	TC4081BP
IC 7	TC40103BP	IC 20	TC40103BP
IC 8	TC40103BP	IC 21	TC4001BP
IC 9	TC4071BP	IC 22	TC40103BP
IC 10	TC4013BP	IC 23	TC4013BP
IC 11	TC4011BP	IC 24	TC40103BP
IC 12	TC40103BP	IC 25	TC4020BP
IC 13	TC4069UBP	IC 26	TC4521BP

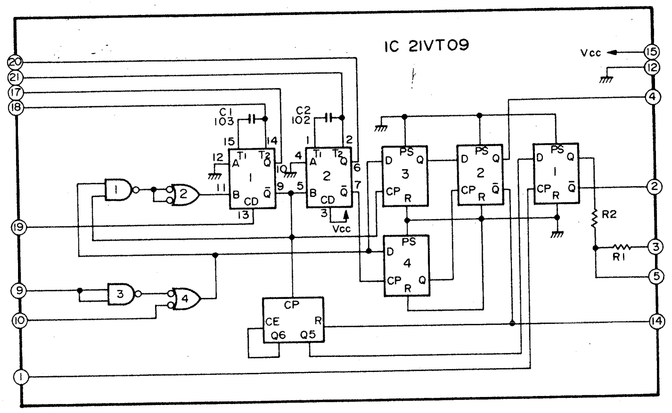

P225
TP12
C52
R58
R58 ERROR ADJ
R49
R49 TRAPEZOID ADJ
R50
R47
R47 TRAPEZOID ADJ
R48
L18
Q6
L3
IC5
C25
TP15
L4
R84
LC2
C6
C26
L11
TP18
C23
R21
R20
R20 3/4 PULSE WIDTH
R41
R15
R15 INPUT VOLTAGE THRESHOLD
R16
R43
R42
R42 PB. 3/4 PULSE WIDTH
R38
R37
R37 PB. VOLTAGE THRESHOLD
C40
TP19

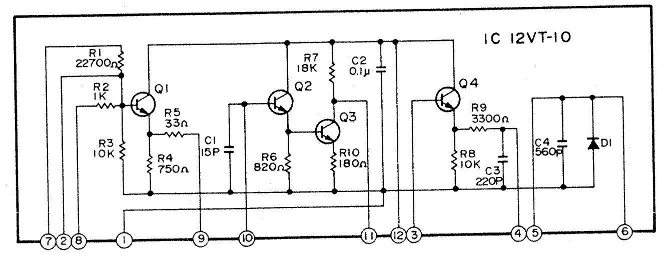
– WARNING BOARD –


IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
TP70
TP71
TP73
TP74
TP75
TP76
TP77
TP78
TP79
TP80
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
R1
R3
R4
R5
R6
R7
L1
CF1
J221
J222
2 3 C,F WARNING PWB

– SYNC SEP. BOARD –


IC40
IC41
C100
C101
C102
C103
C104
C105
R100
R101
SYNC SEP
⑧
⑦
⑥
⑤
④
③
②
①


IC 21VT09
Vcc
C1 103
C2 102
Q6
Q5
CP
R1
R2

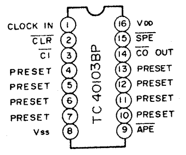

IC 12VT-10
R1 22700Ω
R2 1K
R3 10K
R4 750Ω
R5 33Ω
C1 15P
R6 820Ω
R7 18K
C2 0.1μ
R10 180Ω
Q1
Q2
Q3
Q4
R9 3300Ω
R8 10K
C3 220P
C4 560P
D1

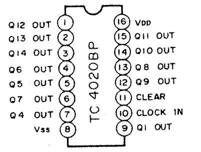
COLOR FRAME SERVO

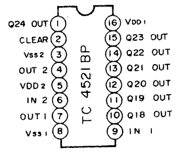
No.	NAME	No.	NAME
IC 1	12 VT10	IC 22	TC4069UBP
IC 2	AN608P	IC 23	TC4071BP
IC 3	21VT09	IC 24	TC4011BP
IC 4	LM311P	IC 25	TC4013BP
IC 5	12VT10	IC 26	TC40103BP
IC 6	AN608P	IC 27	TC4011BP
IC 7	21VT09	IC 28	TC4071BP
IC 8	LM311P	IC 29	TC4011BP
IC 11	TL094CN	IC 30	TC40103BP
IC 12	TC4081BP	IC 31	TC40103BP
IC 13	TC4013BP	IC 32	TC40103BP
IC 14	TC4518BP	IC 33	TC40103BP
IC 15	TC4013BP	IC 34	TC4069UBP
IC 16	TC40103BP	IC 35	TC4013BP
IC 17	TC40103BP		
IC 18	TC40103BP	IC 40	AN301
IC 19	TC40103BP	IC 41	AN301
IC 20	TC4013BP		
IC 21	TC4066BP		

COLOR FRAME WARING

No.	NAME	No.	NAME
IC 1	TC40103BP	IC 14	TC4044BP
IC 2	TC4538BP	IC 15	TC4013BP
IC 3	TC4081BP	IC 16	TC4069UBP
IC 4	TC4013BP	IC 17	TC40103BP
IC 5	TC4082BP	IC 18	TC4071BP
IC 6	TC4017BP	IC 19	TC4081BP
IC 7	TC40103BP	IC 20	TC40103BP
IC 8	TC40103BP	IC 21	TC4001BP
IC 9	TC4071BP	IC 22	TC40103BP
IC 10	TC4013BP	IC 23	TC4013BP
IC 11	TC4011BP	IC 24	TC40103BP
IC 12	TC40103BP	IC 25	TC4020BP
IC 13	TC4069UBP	IC 26	TC4521BP

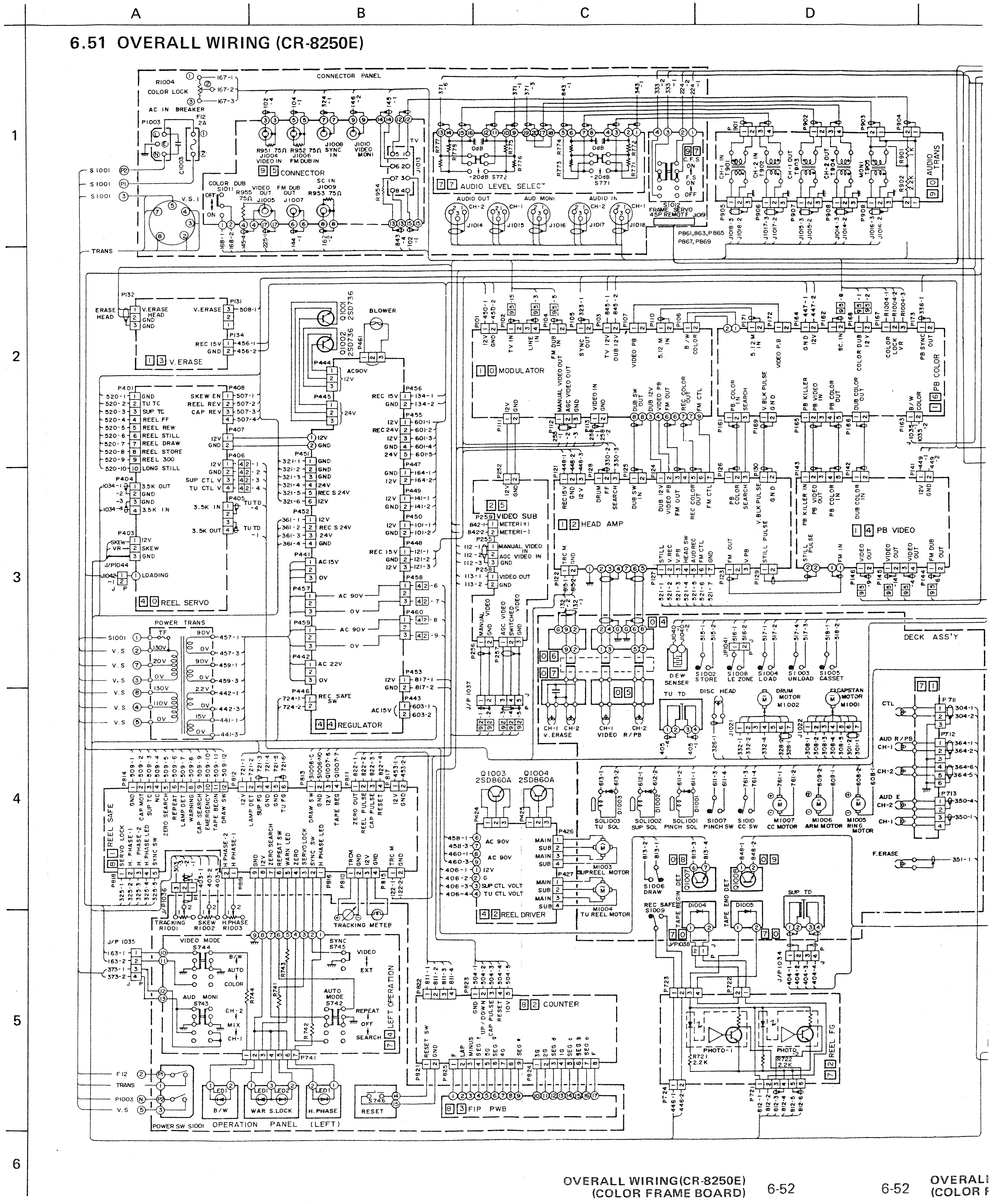

TC 40103BP
CLOCK IN ①
CLR ②
CI ③
PRESET ④
PRESET ⑤
PRESET ⑥
PRESET ⑦
Vss ⑧
⑯ VDD
⑮ SPE
⑭ CO OUT
⑬ PRESET
⑫ PRESET
⑪ PRESET
⑩ PRESET
⑨ APE


TC 4020BP
Q12 OUT ①
Q13 OUT ②
Q14 OUT ③
Q6 OUT ④
Q5 OUT ⑤
Q7 OUT ⑥
Q4 OUT ⑦
Vss ⑧
⑯ VDD
⑮ Q11 OUT
⑭ Q10 OUT
⑬ Q8 OUT
⑫ Q9 OUT
⑪ CLEAR
⑩ CLOCK IN
⑨ Q1 OUT

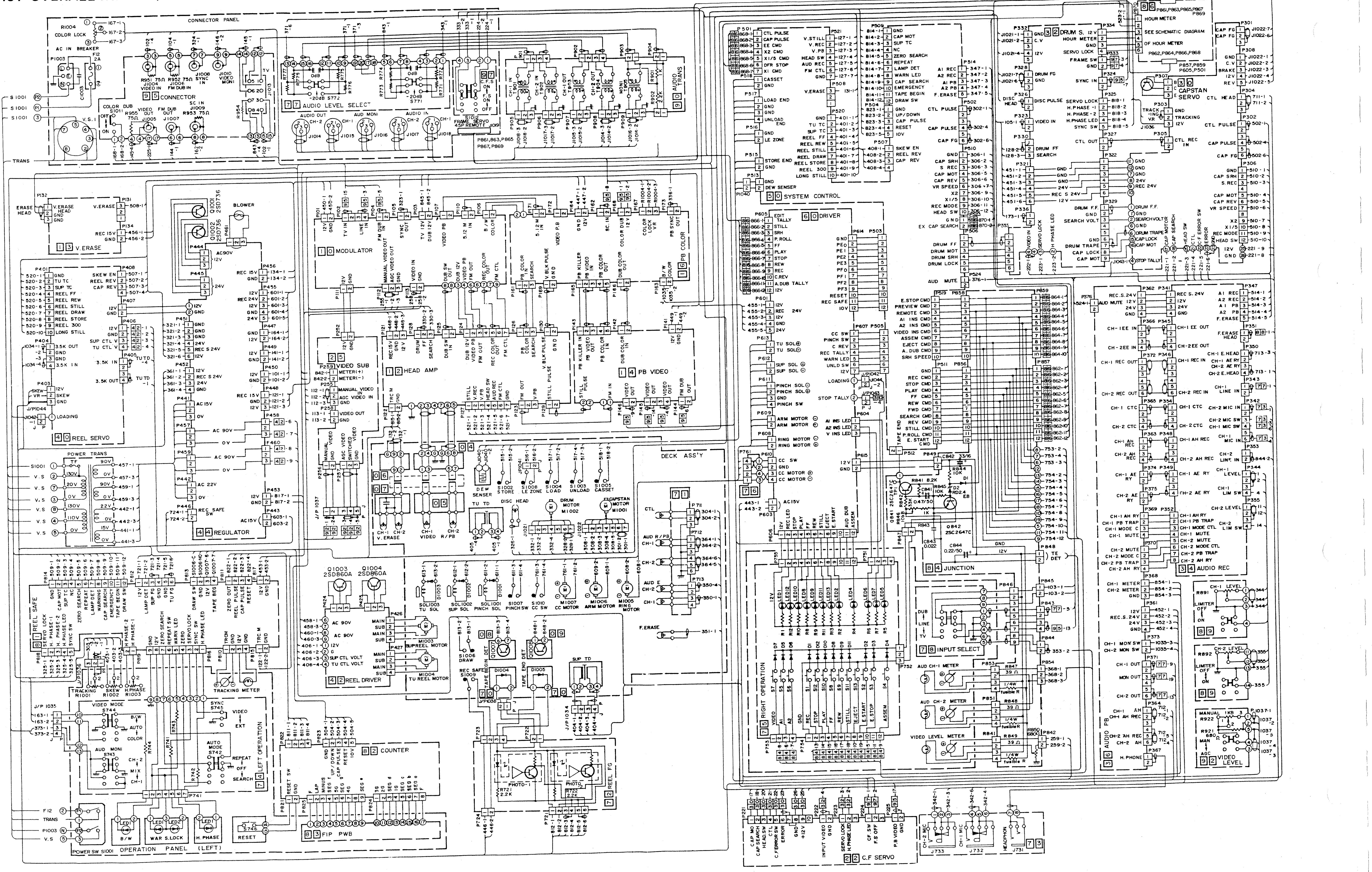

TC 4521BP
Q24 OUT ①
CLEAR ②
Vss2 ③
OUT 2 ④
VDD2 ⑤
IN 2 ⑥
OUT 1 ⑦
Vss1 ⑧
⑯ VDD1
⑮ Q23 OUT
⑭ Q22 OUT
⑬ Q21 OUT
⑫ Q20 OUT
⑪ Q19 OUT
⑩ Q18 OUT
⑨ IN 1

TC40103BP				
INPUT CONTROL				OUTPUT MODE
$\overline{CLR}$	$\overline{AFE}$	$\overline{SPE}$	$\overline{CI}$	
H	H	H	H	Prohibit count
H	H	H	L	Normal count
H	H	L	*	Sync preset
H	L	*	*	Non sync preset
L	*	*	*	Clear

6.51 OVERALL WIRING (CR-8250E)


A
B
C
D
1
2
3
4
5
6
CONNECTOR PANEL
R1004 COLOR LOCK
AC IN BREAKER
P1003
F12 2A
V.S.I
TRANS
CONNECTOR
COLOR DUB S1011
J1004 VIDEO IN
J1006 FM DUB IN
J1008 SYNC IN
J1010 VIDEO MONI
J1005 VIDEO OUT
J1007 FM DUB OUT
J1009 SC IN
TV
AUDIO LEVEL SELECT
S772
S771
AUDIO OUT
AUD MONI
AUDIO IN
J1014
J1015
J1016
J1017
J1018
S1012 FRAME SERVO
45P REMOTE J109
AUDIO TRANS
ERASE HEAD
V.ERASE
BLOWER
Q1001 2SD736
Q1002 2SD736
REEL SERVO
POWER TRANS
REGULATOR
MODULATOR
VIDEO SUB
HEAD AMP
PB VIDEO
PB COLOR
DEW SENSER
S1002 STORE
S1008 CE ZONE
S1004 LOAD
S1003 UNLOAD
S1005 CASSET
DRUM MOTOR M1002
CAPSTAN MOTOR M1001
DISC HEAD
DECK ASS'Y
CTL
AUD R/PB CH-1
CH-2
AUD E CH-2
CH-1
F.ERASE
Q1003 2SD860A
Q1004 2SD860A
SOL1003 TU SOL
SOL1002 SUP SOL
SOL1001 PINCH SOL
S1007 PINCH SW
S1010 CC SW
M1007 CC MOTOR
M1006 ARM MOTOR
M1005 RING MOTOR
M1003 SUP REEL MOTOR
M1004 TU REEL MOTOR
REEL DRIVER
S1006 DRAW
REC SAFE S1009
TAPE BEGIN DET
TAPE END DET
SUP TD
PHOTO-1
PHOTO-2
REEL FG
REEL SAFE
TRACKING R1001
SKEW R1002
H.PHASE R1003
TRACKING METER
VIDEO MODE S744
AUD MONI S743
SYNC S745
AUTO MODE S742
LEFT OPERATION
COUNTER
FIP PWB
RESET S746
B/W
WAR S.LOCK
H.PHASE
POWER SW S1001
OPERATION PANEL (LEFT)

6.51 OVERALL WIRING (CR-8250E)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
CONNECTOR PANEL
95 CONNECTOR
77 AUDIO LEVEL SELECT
FRAME SERVO 4SP REMOTE
90 AUDIO TRANS
50 SYSTEM CONTROL
32 DRUM S.
86 HOUR METER
30 CAPSTAN SERVO
13 V.ERASE
10 MODULATOR
60 DRIVER
96 PB COLOR
25 VIDEO SUB
12 HEAD AMP
14 PB VIDEO
40 REEL SERVO
POWER TRANS
44 REGULATOR
06
07
05
04
DECK ASS'Y
71
76
84 JUNCTION
78 INPUT SELECT
75 RIGHT OPERATION
34 AUDIO REC
36 AUDIO PB
89
88
92 VIDEO LEVEL
81 REEL SAFE
42 REEL DRIVER
74 LEFT OPERATION
82 COUNTER
83 FIP PWB
70
72 REEL FG
22 C.F SERVO
73
POWER SW S1001
OPERATION PANEL (LEFT)
S1001
TRANS
BLOWER
DEW SENSER
DRUM MOTOR M1002
CAPSTAN MOTOR M1001
F.ERASE

6-52 OVERALL WIRING(CR-8250E)
(COLOR FRAME BOARD)

SECTION 7
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

7.1 STANDARD PART NUMBER CODING . . . . . 7 - 2
7.1.1 Screw coding . . . . . 7 - 2
7.1.2 Fuse coding . . . . . 7 - 3
7.2 EXPLODED VIEWX AND PARTS LIST . . . . . 7 - 3
7.2.1 Packing assembly . . . . . 7 - 3
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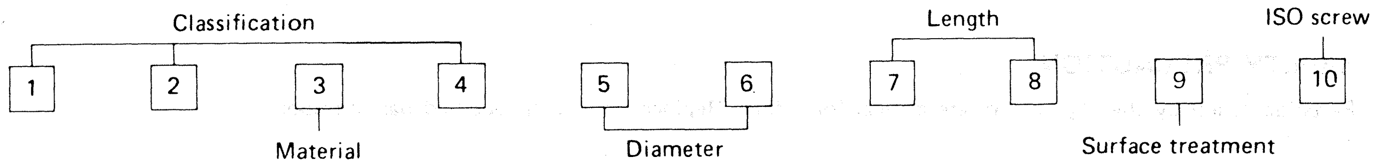
7.1 STANDARD PART NUMBER CODING

7.1.1 Screw coding



Classification (first digit)

Symbol Letter	Name
S	Normal screw
N	Assembly screw
L	"
D	"
M	W. Wood screw
F	Feather screw
T	Set screw
Y	"
B	Bolt
N	Nut
W	Washer
R	E-ring
E	Eyelet
P	Spring
G	Washer head screw

Shape of Screw Head (second digit)

Symbol Letter		Shape of Screw Head
P		Pan head
S		Flat countersunk head
H		Oval countersunk head
D		Binding head
R		Round head
B		Round head
T		Truss head

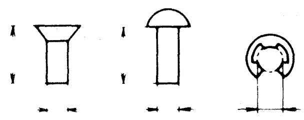
Material (third digit)

Symbol Letter	Material
S	Steel
E	Stainless steel
C	Cast iron
U	Bronze
B	Brass
P	Phosphor bronze
N	German silver
Y	Brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Type of Screw (fourth digit)

Symbol Letter	Type of Screw
P	Cross-Recessed head screw
A	Tapping Screw
B	Special tapping screw
T	Special tapping screw
E	Special tapping screw
F	Special tapping screw

Diameter and Length of Screw (fifth – eighth digit)



– Example –

S P B P 3 0 0 6 Z S

(Diameter x 10) (Length)

Diameter : 3 mm

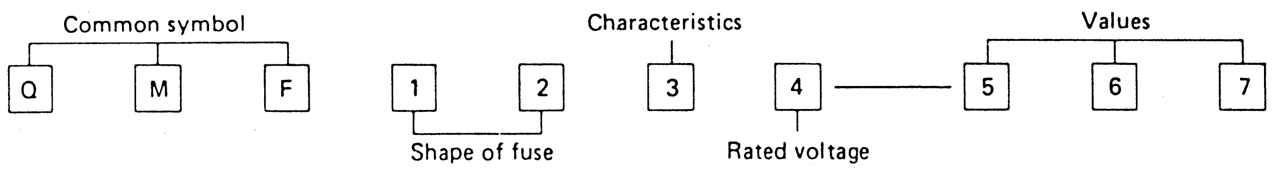
Length : 6 mm

Surface Treatment (ninth digit)

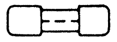
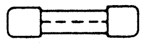
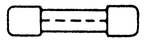
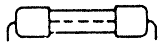
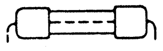
Symbol Letter	Surface Treatment
Z	Galvanization, dichromic acid treatment (MFZn2-C)
N	Nickel plating (MFNi2, MFNi1)
R	Chrome plating (MBCr2, MBCr1)
G	Silver plating (SP4)
W	Nichrome platings
P	Phosphite treatment
B	Bronze plating

Symbol Letter	Surface Treatment
M	Black coloring after galvanization
A	Red coloring after galvanization
C	Blue coloring after galvanization
T	Green coloring after galvanization
V	Violet coloring after galvanization
F	Iron with black coloring

7.1.2 Fuse coding



Shape of Fuse (first and second digit)

Symbol No.	Shape	Remarks
51		φ 5.2 x 20
60		φ 6.4 x 30
61		φ 6.35 x 31.8
63		With 60 Lead Wire
66		With 61 Lead Wire

Rated Voltage (fourth digit)

Symbol No.	Rated Voltage	
1	AC 125 V	
2	AC 250 V	
3	100 mA ≀ 1 A	AC 250 V
	1.25 A ≀ 6.3 A	AC125 V

Values (fifh-seventh digit)

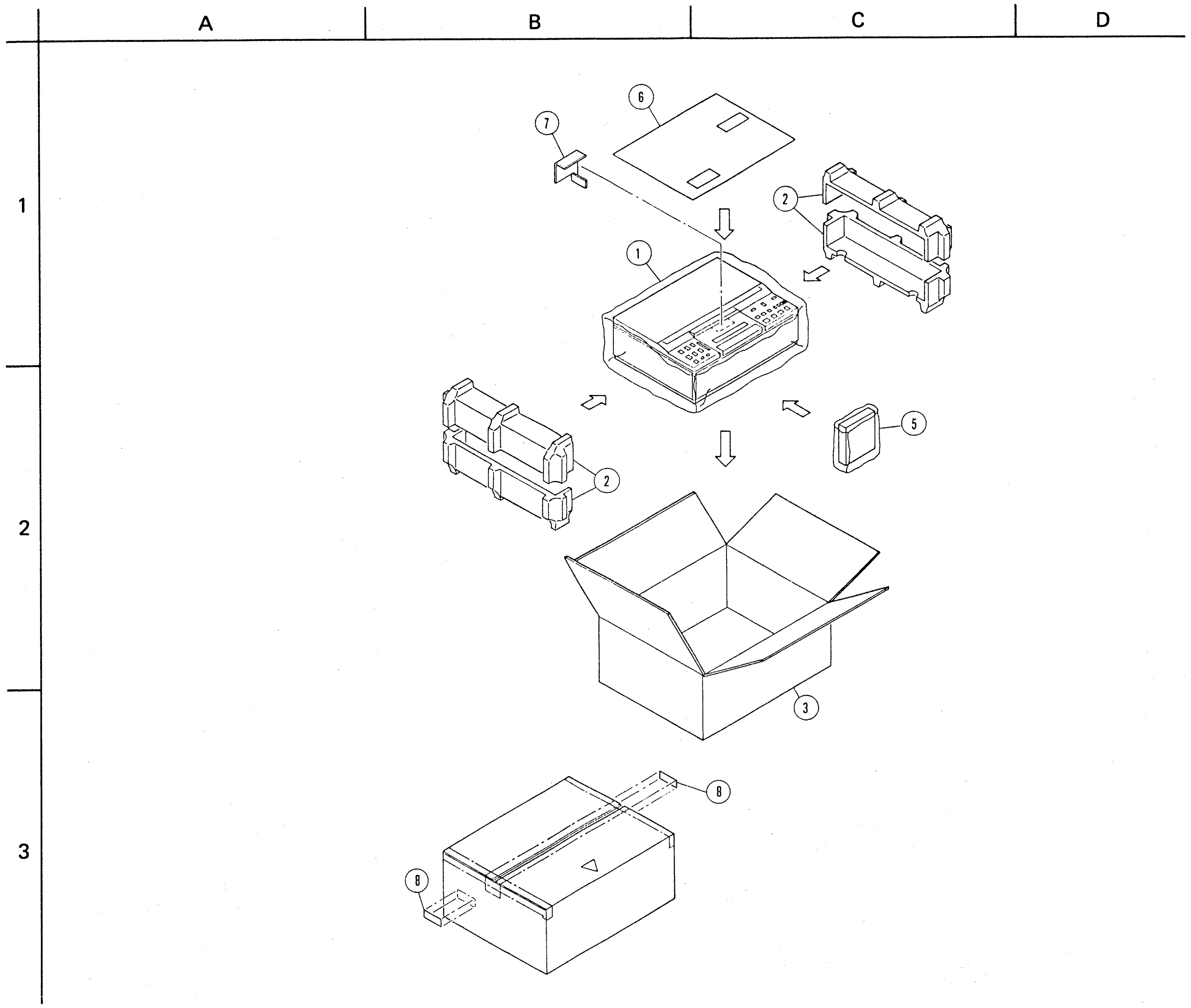
R10	100 mA
R125	125 mA
1R0	1.0 A
1R2	1.2 A
1R25	1.25 A
100	10 A

Characteristics (third digit)

Symbol No.	Fusing Current	Fusing Time	Remarks
S	160%	Within 1 hr.	Anti-rush Type
	200%	" 2 min.	
	700% – 2000%	" 0.01 sec.	
R	160%	" 1 hr.	Regular Fusible Type
	200%	" 2 min.	
M	135%	" 1 hr.	Regular Fusible Type (for UL)
	200%	" 2 min.	
U	135%	" 1 hr.	Anti-rush Type (for UL)
	200%	" 2 min.	
	800% – 2000%	" 0.01 sec.	
A	210%	" 2 min.	Anti-rush Type (for Europe)
	275%	0.5 – 10 sec.	
	400%	0.15 – 2 sec.	
	1000%	0.02 – 0.3 sec.	
B	210%	Within 30 min.	Regular Fusible Type (for SEMKO, Europe)
	275%	0.05 – 2 sec.	
	400%	0.01 – 0.3 sec.	
C	135%	Within 1 hr.	Anti-rush Type (for UL, Japan)
	200%	" 2 min.	

7.2 EXPLODED VIEWS AND PARTS LIST

7.2.1 Packing assembly

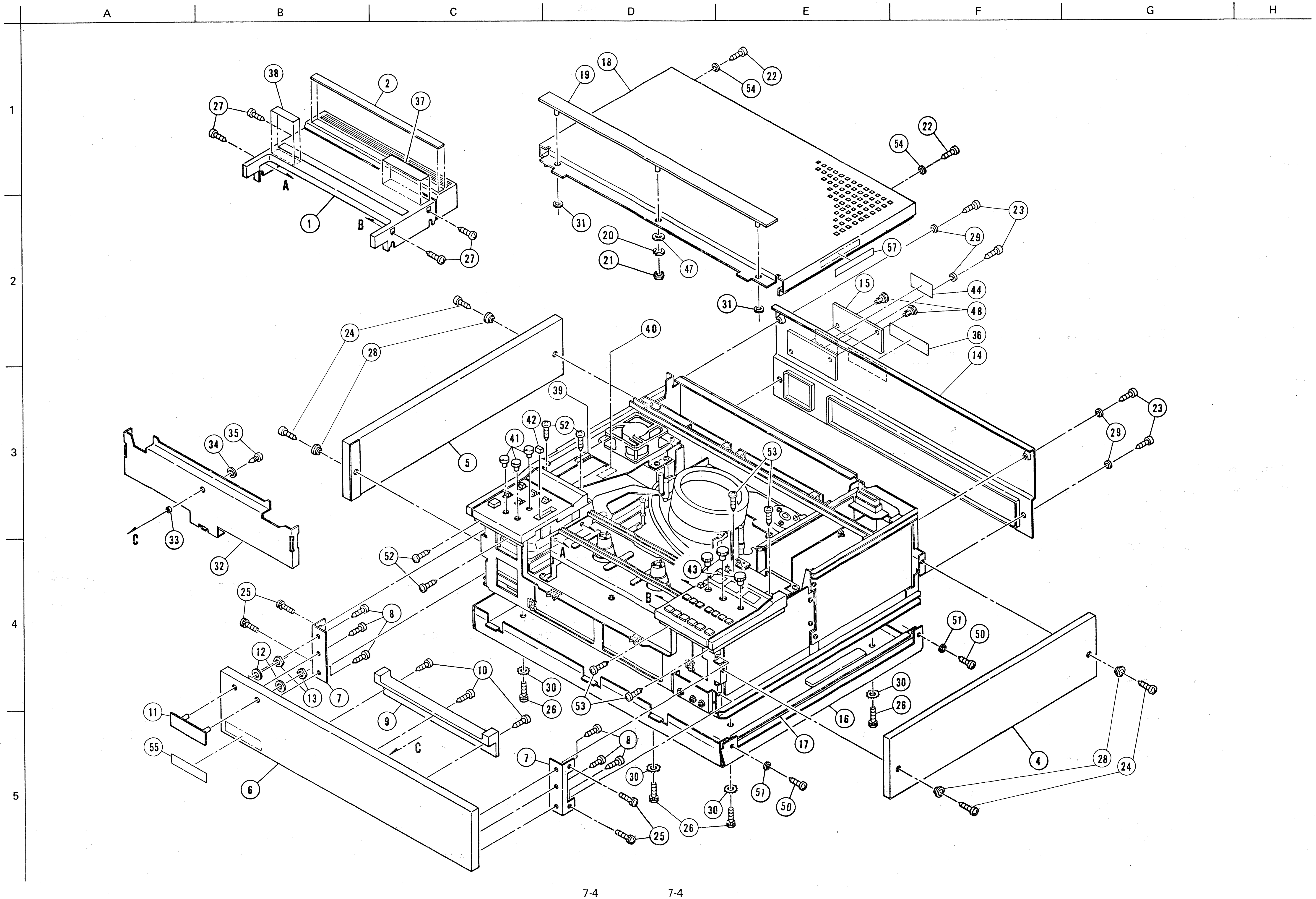


– Packing assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PUP40528	Poly Bag			1-B	1
2	PUP10111A	Cushion Ass'y			2-B, 1-C	2
3	PUP20269-7-7	Packing Case		□	3-C	1
	" -8-7	"		◎	3-C	1
	" -9-7	"		★	3-C	1
4	–	–				–
5	PU30425-532	Instruction Book		□	2-C	1
	" -533	"		◎		1
	" -534	"		★		1
	PU30307-11	Dust Cover				1
	QPGB024-03404	Poly Bag				1
	GU35252A	Monitor Cord				1
	PU45506	Caution Tag				1
	A49005-1	Beads Band				1
6	PUP40551-2	Board			1-B	1
7	PUP40556	Guard			1-B	1
8	PUP40619	Serial No. Sticker			3-B, 3-C	2

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.2 Cabinet Assembly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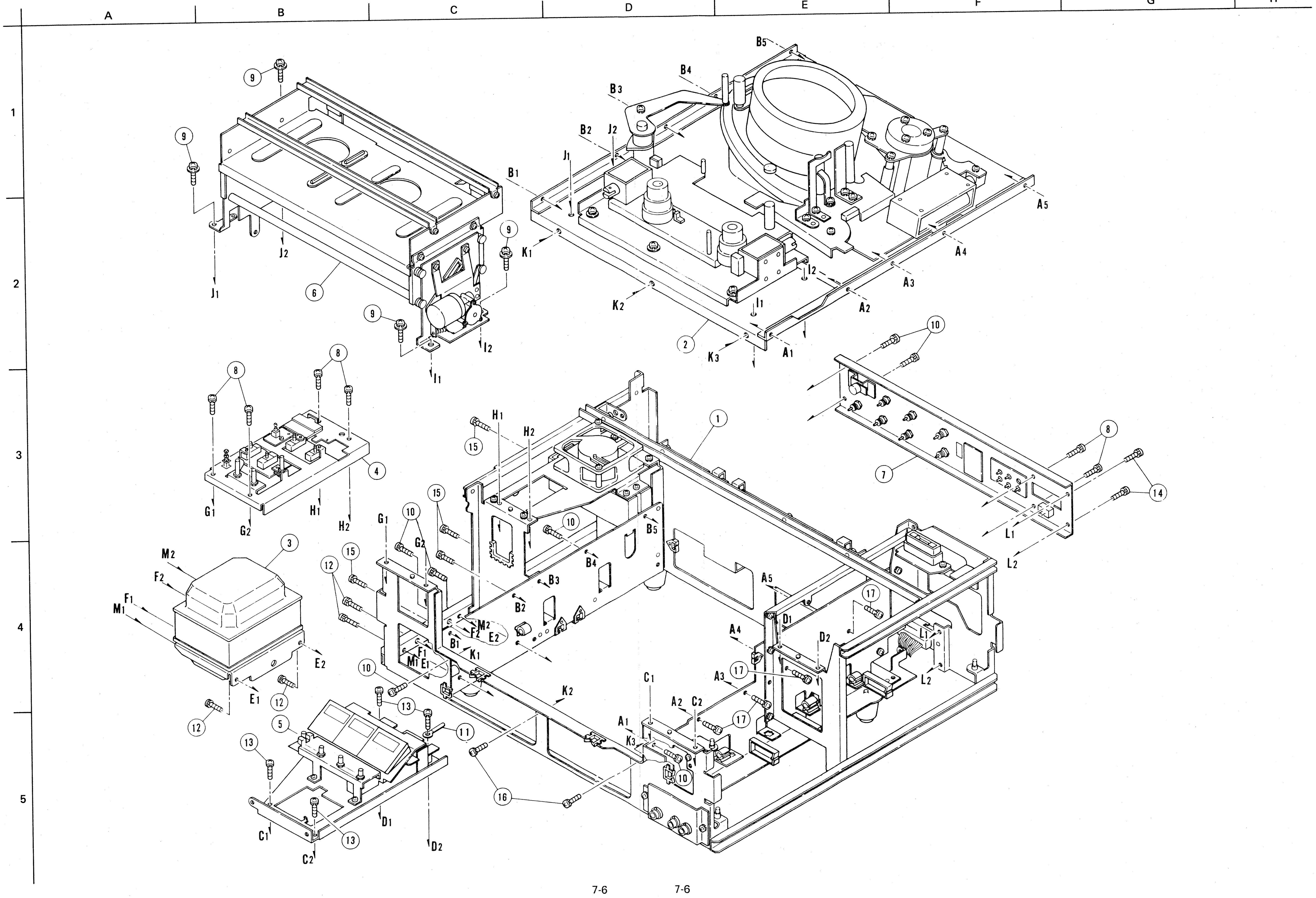
– Cabinet assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU32443C	Cassette Cover Ass'y			2-B	1
2	PU33712-7-3	Mark Plate		□	1-C	1
	″ -8-3	″		⊙	1-C	1
	″ -9-3	″		★	1-C	1
3	–	–			–	–
4	PU10256-5	Side Cover (R)			5-F	1
5	″ -6	″ (L)			3-C	1
6	PU10255-3	Front Board			5-B	1
7	PU48603	Bracket			4-B, 5-C	2
8	MRSP3110Z	Screw			4-C, 5-D	6
9	PU32397-3	Fitting			5-C	1
10	MRSP3113Z	Screw			4-C	3
11	PU48660	Mark			4-A	1
12	WNB3000N	Washer			4-B	2
13	NNB3000NS	Nut			4-B	2
14	PU10254	Rear Plate			2-F	1
15	PUM30020-25	Serial No. Plate		□	2-E	1
	″ -26	″		⊙	2-E	1
	″ -27	″		★	2-E	1
16	PU10253	Bottom Cover		□⊙	5-E	1
	″ -2	″		★	5-E	1
17	PU20928	Side Plate			5-E	1
18	PU10252-3	Top Cover			1-D	1
19	PU10261-3	Fitting			1-D	1
20	WLS3000N	Spring Washer			2-D	1
21	NNB3000N	Nut			2-D	1
22	SDBP3006R	Screw			1-E, 1-F	2
23	SDBP3006M	″			2-F, 3-G	4
24	SDSP4016R	″			2-B, 5-G	4
25	LPSP3006Z	″			4-B, 5-D	4
26	LPSP4008Z	″			4,5-D, 4-F	4
27	SDBP3004M	″			1-B, 2-C	4
28	PU46595	Washer			2-C, 5-G	4
29	WAS3000N	Lock Washer			2-F, 3-G	4
30	WBS4000N	″			4-D, 5-D	4
31	PU41705	Speed Nut			2-D, 2-E	2
32	PU21007	Front Stay			4-B	1
33	PU43769-8	Collar			3-A	1
34	WNB3000N	Washer			3-B	1
35	MRSP2713Z	Screw			3-B	1
36	PU47379	Label			2-F	1
37	PU54069	Sticker			1-C	1
38	PU49660-2	″			1-B	1
39	PU48278-2	″			3-D	1
40	PU48278	″			2-D	1
41	PU48649	Knob			3-C	3
42	PU48655	″			3-C	1
43	PU48649	″		□⊙	4-D	3
44	PU46146	Sticker			2-F	1
45	–	–			–	–
46	–	–			–	–
47	WNS3000N	Washer			2-D	1
48	PU53276	Plastic Rivet			2-F	2
49	–	–			–	–
50	SDBP3006M	Screw			5-E, 4-F	2
51	WAS3000N	Lock Washer			4-F, 5-E	2
52	SDBP3006M	Screw			4-C, 3-D	4
53	SDBP3006M	″			3-E, 4-D	4
54	WAS3000N	Lock Washer			1-E, F	2
55	PU42945	Sticker			5-A	1
56	–	–			–	–
57	PU48692	Sheet (inside)			2-F	1

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.3 Mechanism assembly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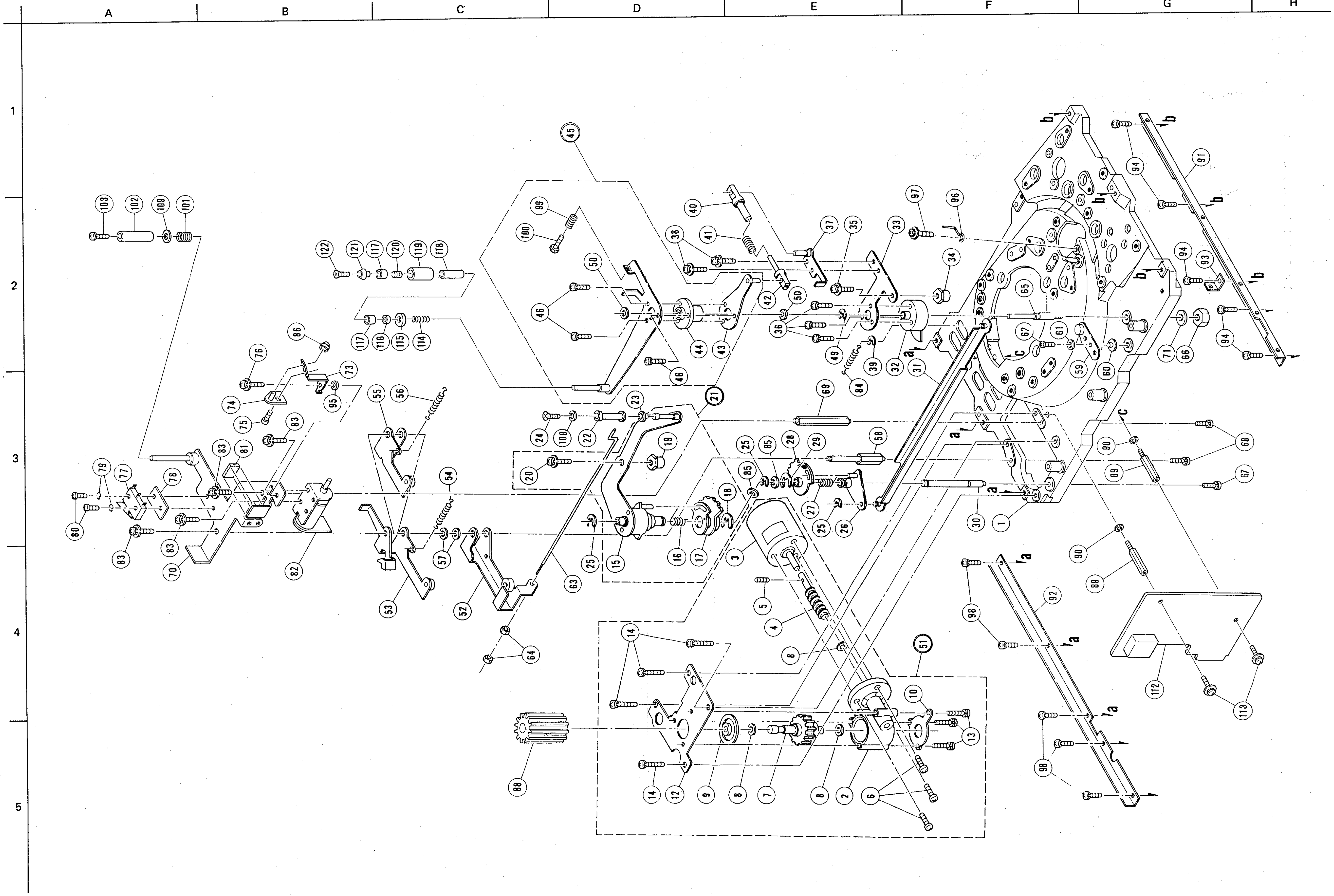
– Mechanism assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Frame Ass'y	See Sec. 7.9, 7.10.		3-D	1
2	–	Main Deck Ass'y	See Sec. 7.5, 7.6, 7.7, 7.8.		2-D	1
⚠ 3	PU49965B	Power Transformer			4-B	1
4	–	Left Control Ass'y	See Sec. 7.12.		3-B	1
5	–	Right Control Ass'y	See Sec. 7.13.		5-B	1
6	–	Cassette Compartment Ass'y	See Sec. 7.11.		2-B	1
7	–	Connector Panel Ass'y	See Sec. 7.15, 7.16.		3-E	1
8	LPSP3006Z	Screw			2-B, 3-G	4
9	DPSP3006Z	"			1-A,B, 2-B,C	4
10	LPSP4006Z	"			2-F, 3-C,D, 4-B, 5-D	6
11	PU49485-4	Wire Clamp			5-C	1
12	–	–				–
13	LPSP3006Z	Screw			5-B, 4-C	4
14	LPSP3006Z	"			3-G	2
15	LPSP4006Z	"			4-B, 3-C	5
16	LPSP4006Z	"			5-C	3
17	LPSP4006Z	"			4-E, 5-E	5

7.2.4 Main deck assembly (1)



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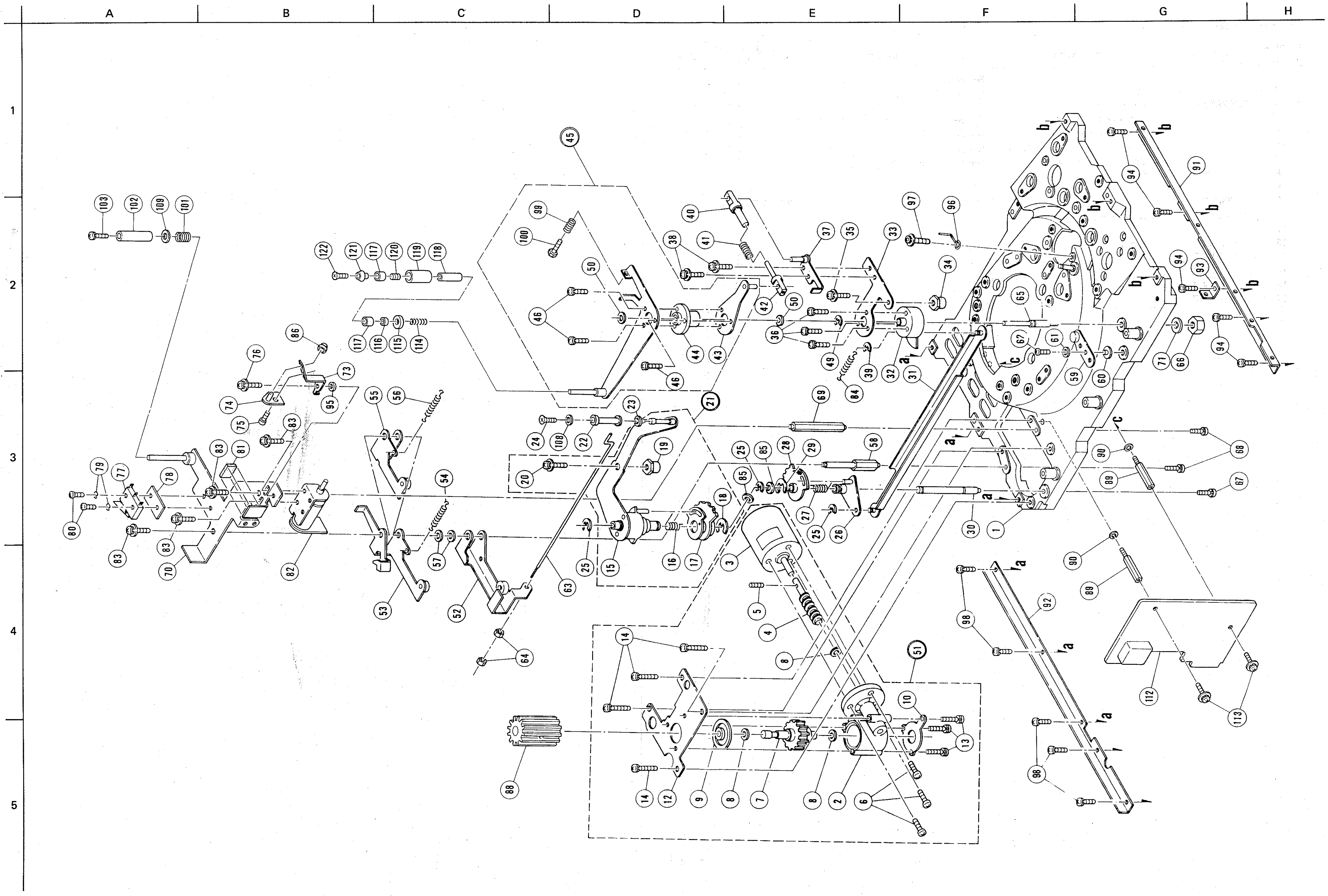
– Mechanism assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Frame Ass'y	See Sec. 7.9, 7.10.		3-D	1
2	–	Main Deck Ass'y	See Sec. 7.5, 7.6, 7.7, 7.8.		2-D	1
⚠ 3	PU49965B	Power Transformer			4-B	1
4	–	Left Control Ass'y	See Sec. 7.12.		3-B	1
5	–	Right Control Ass'y	See Sec. 7.13.		5-B	1
6	–	Cassette Compartment Ass'y	See Sec. 7.11.		2-B	1
7	–	Connector Panel Ass'y	See Sec. 7.15, 7.16.		3-E	1
8	LPSP3006Z	Screw			2-B, 3-G	4
9	DPSP3006Z	"			1-A,B, 2-B,C	4
10	LPSP4006Z	"			2-F, 3-C,D, 4-B, 5-D	6
11	PU49485-4	Wire Clamp			5-C	1
12	–	–				–
13	LPSP3006Z	Screw			5-B, 4-C	4
14	LPSP3006Z	"			3-G	2
15	LPSP4006Z	"			4-B, 3-C	5
16	LPSP4006Z	"			5-C	3
17	LPSP4006Z	"			4-E, 5-E	5

7.2.4 Main deck assembly (1)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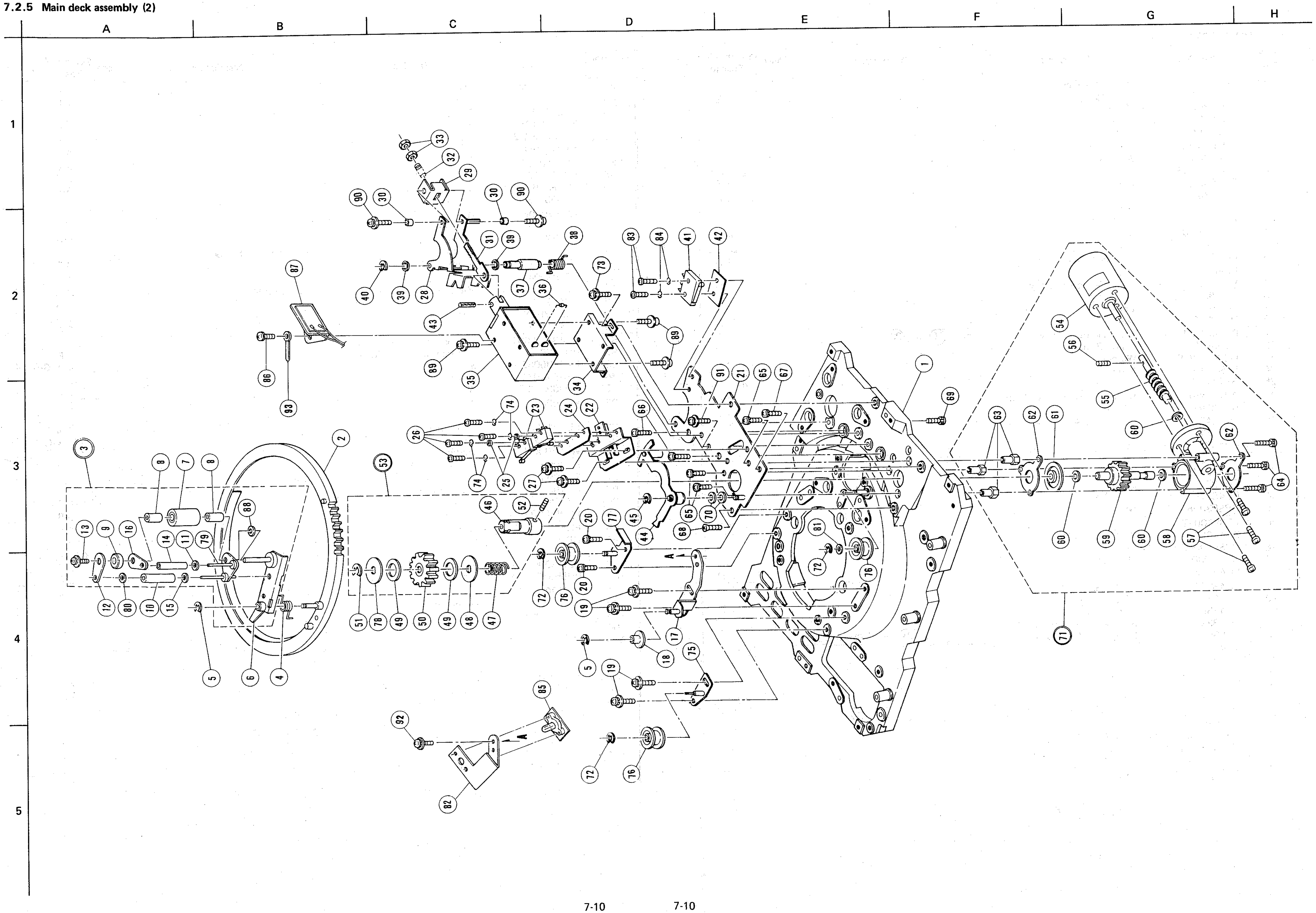
7-8

– Main deck assembly (1) list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Main Deck Base			3-F	1
2	PU32374	Housing			5-E	1
3	PU48362-2	Motor			4-E	1
4	PU48363	Worm			4-E	1
5	YFS2004	Setscrew			4-E	1
6	LPSP3006Z	Screw			5-E	3
7	PU48364B	Worm Wheel Ass'y			5-E	1
8	Q03093-818	Washer			4-E, 5-E	3
9	PU48365	Cover			5-D	1
10	PU48366	Plate			4-F	1
11	–	–			–	–
12	PU48429	L. MD Mounting			5-D	1
13	LPSP3025Z	Screw			5-F	3
14	LPSP3010Z	"			4-D, 5-D	4
15	PU32375B	TU Loading Arm Ass'y			4-D	1
16	PU50296	Coil Spring			4-D	1
17	PU32377	TU Loading Arm Drive			4-D	1
18	REE8000	"E" Ring			3-D	1
19	PU48414	Lock Pin			3-D	1
20	DPSP3008Z	Screw			3-C	1
21	PUS46161B	TU Loading Arm Ass'y	Incl. ⑮ to ⑳		3-D	1
22	PU53913-1-1	Guide Roller			3-D	1
23	Q03093-826	Washer			3-D	1
24	SPSP2006Z6	Screw			3-C, 3-E	1
25	REE5000	"E" Ring			4-D, 3-E	3
26	PU48389A	S. Loading Arm Drive Plate Ass'y			3-E	1
27	PU48393	Coil Spring			3-E	1
28	PU32421	S. Loading Arm Drive			3-E	1
29	REE8000	"E" Ring			3-E	1
30	PU48304	Stud			3-F	1
31	PU48386A	Connecting Plate Ass'y			3-F	1
32	PU48377	S. TU Arm Drive			2-E	1
33	PU48378	Plate			2-E	1
34	PU48379	Stop Pin			2-F	1
35	DPSP3008Z	Screw			2-E	1
36	LPSP3008Z	"			2-E	3
37	PU48380A-1	DP Holder Ass'y			2-E	1
38	DPSP3006Z	Screw			2-D	2
39	REE5000	"E" Ring			2-E	1
40	PU48333	DP-1			2-D	1
41	PU48385	Comp. Spring			2-D	1
42	PU48384	DP-2			2-E	1
43	PU48397A	Plate Ass'y			2-D	1
44	PU48394A	S. Tension Arm Holder Ass'y			2-D	1
45	PU53904A-1	S. Tension Arm Ass'y	Incl. ㊸ to ㊻ and (99) and (100)		1-D	1
46	SDSP3012Z	Screw			2-C, 3-D	3
47	–	–			–	–
48	–	–			–	–
49	REE5000	"E" Ring			2-E	1
50	Q03093-817	Washer			2-D, 2-E	2
51	PUS36060C	TU Loading Arm Motor Ass'y	Incl. ② to ⑩ and ⑫ and ⑬		4-F	1
52	PU48402A	Loading Arm Drive Ass'y			4-C	1
53	PU48408A	Lock Arm Ass'y			4-C	1
54	PU35005-014	Spring			3-C	1
55	PU48406A	Drive Arm Ass'y			3-B	1
56	PU35005-110	Spring			3-C	1
57	Q03093-837	Washer			4-C	2
58	PU48498	Stud			3-E	1
59	PU48399A	End Lock Arm Ass'y			3-F	1
60	PU48430	Bushing			3-G	1
61	Q03091-105	Washer			2-F	1
62	LPSP3012Z	Screw			2-F	1
63	PU32423	Pull Rod			4-D	1
64	NNS2300N	Nut			4-C	2
65	PU48305-1-2	Stud			2-F	1
66	NNS4000Z	Nut			2-G	1
67	LPSP4012Z	Screw			3-G	1
68	LPSP3010Z	"			3-G	2
69	PU48306	Stud			3-E	1
70	PU55027A	Protector			4-A	1
71	WNS4000N	Washer			2-G	–
72	–	–			–	–
73	PU53914	Holder			2-B	1
74	–	Photo Transistor Board	(Start Sensor) See Sec. 8.8.		3-B	1
75	SPSP2604Z	Screw			3-B	1
76	LPSP3004Z	"			2-B	1
77	QSM1S01-014	Microswitch	Draw End SW		3-A	1
78	PU44212	Spacer			3-A	1
79	WLS2300N	Lock Washer			3-A	2
80	SPSP2310Z	Screw			3-A	2
81	PU48418-004	Felt Sheet			3-B	1
82	PU48591A	Differential Trans. Ass'y			4-B	1
83	DPSP3006Z	Screw			3-A, 4-A, 3-B	4
84	T30300-143	Spring			5-E	1
85	Q03093-837	Washer			3-E	2
86	PU49209	Shade			2-B	1
87	–	–			–	–
88	PU52136A	Drive Gear Ass'y			5-C, 4-G	1
89	PU53863	Stud			3-G, 4-G	2
90	WLS3000N	Washer			4-F, 3-G	2
91	PU20907	Side Angle (R)			1-G	1
92	PU20908	" (L)			4-F	1
93	PU49376	Spring Hook			2-G	1
94	LPSP4010Z	Screw			1-G, 2-G	5
95	WNB3000N	Washer			3-B	1
96	PU50227	Spring			2-F	1
97	DPSP3008Z	Screw			2-F	1
98	LPSP4010Z	"			4-F, 5-F	5
99	PUM30002-57	Spring			2-C	1
100	PU55310	S. Bolt			2-C	1
101	PUM30002-40	Spring			2-A	1
102	PU54853	Guide Pole			2-A	1
103	SDSP3006T	Screw			2-A	1
104	–	–			–	–
105	–	–			–	–
106	–	–			–	–
107	–	–			–	–
108	PU51099	Cap			3-D	1
109	PUM30018-8	Spacer			2-A	1
110	–	–			–	–
111	–	–			–	–
112	–	Counter CTL P.C.B. Ass'y	See Sec. 8.37		4-G	1
113	DPSP3008Z	Screw			4-G	1
114	PU30080-007	Compression Spring			2-C	1
115	PU53888-2	Guide Flange			2-C	1
116	PUM30005-20	Collar			2-C	1
117	PU44093	Bearing			2-B	2
118	PU53910	Spacer			2-C	1
119	PU54711	Roller			2-C	1
120	PUM30002-42	Compression Spring			2-C	1
121	PU53911	Cap			2-B	1
122	SSSP2006Z	Screw			2-B	1

7.2.5 Main deck assembly (2)



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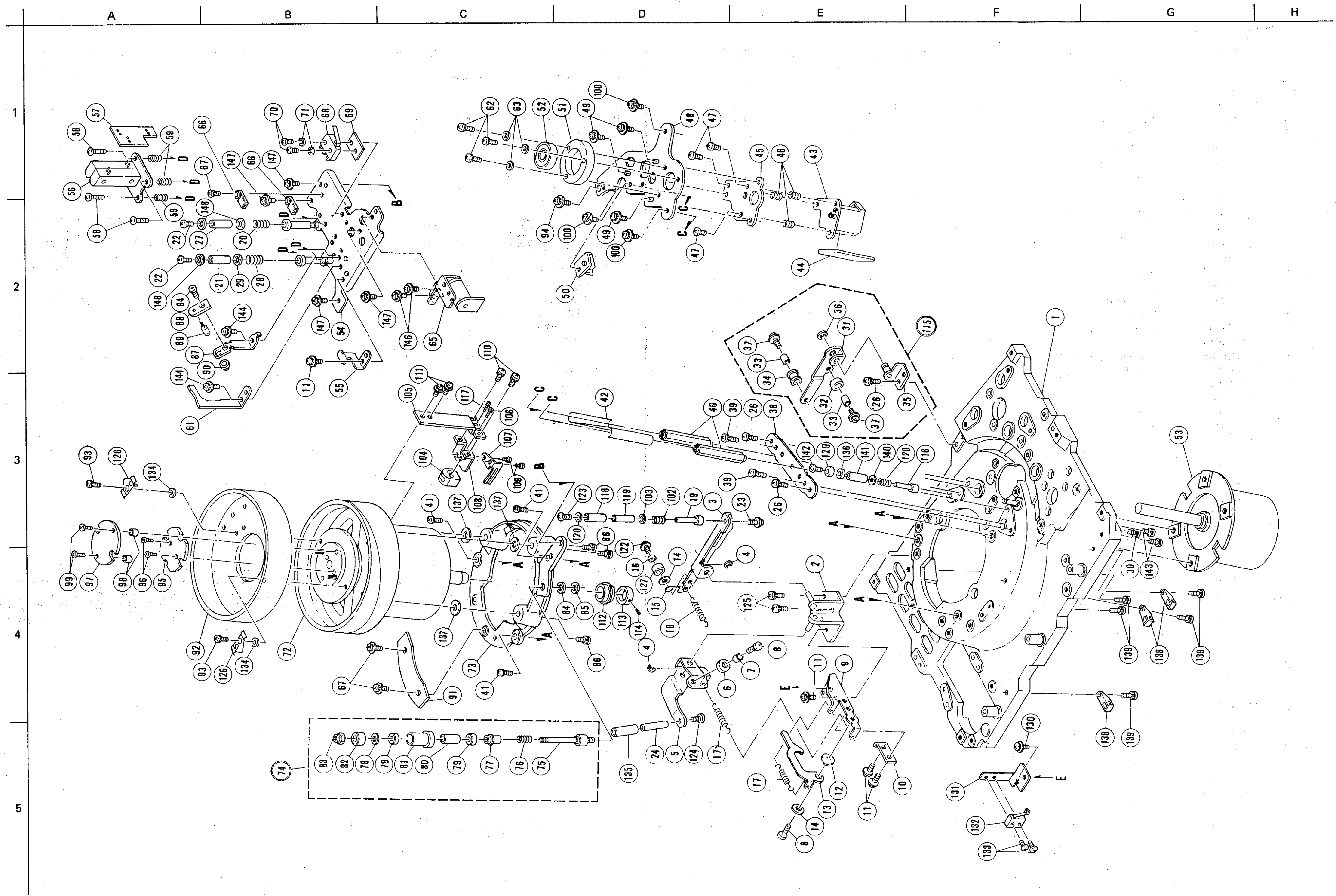
– Main deck assembly (2) list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Main Deck Base			2-F	1
2	PU32372A	Loading Ring Ass'y			3-B	1
3	PU33709A-2	Pinch Roller Arm Ass'y	Incl.⑥– ⑯ , (79) , (80) , (88)		3-A	1
4	PU48361	Coil Spring			4-B	1
5	REE3000	"E" Ring			4-B, 4-D	2
6	PU53985A	Pinch Roller Arm S.A.			4-B	1
7	PU50400A	Pinch Roller Ass'y			3-A	1
8	PU48357	Spacer			3-A, 3-B	2
9	PU50403-2	Guide In Roller			3-A	1
10	PU53902-2	Roller			4-A	1
11	Q03093-830	Washer			3-A	2
12	PU53903-2	Plate			4-A	1
13	SPSP2606Z	Screw			3-A	1
14	PU53902	Roller			3-A	1
15	Q03093-828	Washer			4-A	2
16	PU53903	Plate			3-A	1
17	PU53889A	Bracket Ass'y			4-D	1
18	PU48320	End Set Roller			4-D	1
19	DPSP3010Z	Screw			4-D	4
20	LPSP3010Z	"			3-D, 4-D	2
21	PU32369A	Sub Mounting Plate Ass'y			2-E	1
22	PU48321A	Reel Plate Ass'y			3-D	1
23	QSM1S01-023	Microswitch	Loading end SW, Unloading end SW		3-C	2
24	PU48324	Spacer			3-D	1
25	WSB2300N	Lock Washer			3-C	2
26	SPSP2310N	Screw			3-C	4
27	DPSP3006Z	"			3-C	2
28	PU50405	Pinch Roller Pressure Arm			2-C	1
29	PU48326	Regulator			1-C	1
30	T30302-010	Collar			1-C	2
31	PU48327	Power Plate			2-C	1
32	PU30080-066	Spring			1-C	1
33	NNS5000N	Nut			1-C	2
34	PU48328	P. Solenoid Holder			3-D	1
35	PU48329	Solenoid Ass'y			2-C	1
36	WO3C	Diode			2-C	1
37	PU48330	Stud			2-C	1
38	PU48331	Coil Spring			2-D	1
39	Q03093-837	Washer			2-C	2
40	REE5000	"E" Ring			2-B	1
41	QSM1S01-014	Microswitch	Store end SW		2-D	1
42	PU44212	Spacer			2-D	1
43	PRE4012	Spring Pin			2-C	1
44	PU48372A	Lock Arm Ass'y			3-D	1
45	REE5000	"E" Ring			3-D	1
46	PU48368	Gear Holder			3-C	1
47	PU30080-067	Spring			4-C	1
48	PU48369	Clutch Disk			4-C	1
49	PU48370	Felt Ring			4-C	2
50	PU48371	Ring Drive Gear			4-C	1
51	REE7000	"E" Ring			4-B	1
52	YWS3003P	Setscrew			3-C	1
53	PUS46150B	Ring Drive Gear Ass'y	Incl. ㊻ to (52) and (78)		3-C	1
54	PU48362-2	Motor			2-F	1
55	PU48363	Worm			3-G	1
56	YFS2004	Setscrew			2-G	1
57	LPSP3006Z	Screw			3-G	3
58	PU32374	Housing			3-G	1
59	PU48364B	Worm Wheel Ass'y			3-G	1
60	Q03093-818	Washer			3-F, 3-F	3
61	PU48365	Cover			3-F	1
62	PU48366	Plate			3-F, 3-G	2
63	PU48367	Spacer			3-F	3
64	LPSP3025Z	Screw			3-H	3
65	LPSP3006Z	"			3-D, 2-E	3
66	LPSP4020Z	"			3-D	1
67	LPSP4012Z	"			2-E	1
68	SSSP4010Z	"			3-D	1
69	LPSP4010Z	"			3-F	1
70	Q03093-836	Washer			3-D	2
71	PUS36063C	Loading Ring Motor Ass'y	Incl. (54) and (57) to (64)		4-F	1
72	REE2500	"E" Ring			4-C, 5-D, 4-E	3
73	DPSP3012Z	Screw			2-D	1
74	WLS2300N	Lock Washer			3-C	4
75	PU48315A	Guide Roller Hold Ass'y			4-D	1
76	PU48314	Ring Guide Roller			4-D, 5-D, 4-E	3
77	PU48312A	Guide Roller Hold Ass'y			3-D	1
78	PU48369-2	Clutch Disk			4-C	1
79	PU53897A	Plate Ass'y			3-B	1
80	Q03093-829	Washer			4-A	1
81	Q03093-825	"			3-E	1
82	PU53892	Bracket			5-C	1
83	SPSP2310N	Screw			2-D	2
84	WLS2300N	Lock Washer			2-D	2
85	–	LED P.C.B.	See Sec. 8.27		4-C	1
86	LPSP3005Z	Screw			2-B	1
87	PU50570	Dew Sensor			2-B	1
88	Q03091-206	Washer			3-B	1
89	DPSP3006Z	Screw			2-C, 2-D	3
90	DPSP3006Z	"			1-B, 2-C	2
91	DPSP3010Z	"			2-D	1
92	DPSP3006Z	"			4-C	1
93	PU49485-3	Wire Clamp			3-B	1

– Main deck assembly (2) list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Main Deck Base			2-F	1
2	PU32372A	Loading Ring Ass'y			3-B	1
3	PU33709A-2	Pinch Roller Arm Ass'y	Incl.⑥– ⑯, (79), (80), (88)		3-A	1
4	PU48361	Coil Spring			4-B	1
5	REE3000	"E" Ring			4-B, 4-D	2
6	PU53985A	Pinch Roller Arm S.A.			4-B	1
7	PU50400A	Pinch Roller Ass'y			3-A	1
8	PU48357	Spacer			3-A, 3-B	2
9	PU50403-2	Guide In Roller			3-A	1
10	PU53902-2	Roller			4-A	1
11	Q03093-830	Washer			3-A	2
12	PU53903-2	Plate			4-A	1
13	SPSP2606Z	Screw			3-A	1
14	PU53902	Roller			3-A	1
15	Q03093-828	Washer			4-A	2
16	PU53903	Plate			3-A	1
17	PU53889A	Bracket Ass'y			4-D	1
18	PU48320	End Set Roller			4-D	1
19	DPSP3010Z	Screw			4-D	4
20	LPSP3010Z	"			3-D, 4-D	2
21	PU32369A	Sub Mounting Plate Ass'y			2-E	1
22	PU48321A	Reel Plate Ass'y			3-D	1
23	QSM1S01-023	Microswitch	Loading end SW, Unloading end SW		3-C	2
24	PU48324	Spacer			3-D	1
25	WSB2300N	Lock Washer			3-C	2
26	SPSP2310N	Screw			3-C	4
27	DPSP3006Z	"			3-C	2
28	PU50405	Pinch Roller Pressure Arm			2-C	1
29	PU48326	Regulator			1-C	1
30	T30302-010	Collar			1-C	2
31	PU48327	Power Plate			2-C	1
32	PU30080-066	Spring			1-C	1
33	NNS5000N	Nut			1-C	2
34	PU48328	P. Solenoid Holder			3-D	1
35	PU48329	Solenoid Ass'y			2-C	1
36	WO3C	Diode			2-C	1
37	PU48330	Stud			2-C	1
38	PU48331	Coil Spring			2-D	1
39	Q03093-837	Washer			2-C	2
40	REE5000	"E" Ring			2-B	1
41	QSM1S01-014	Microswitch	Store end SW		2-D	1
42	PU44212	Spacer			2-D	1
43	PRE4012	Spring Pin			2-C	1
44	PU48372A	Lock Arm Ass'y			3-D	1
45	REE5000	"E" Ring			3-D	1
46	PU48368	Gear Holder			3-C	1
47	PU30080-067	Spring			4-C	1
48	PU48369	Clutch Disk			4-C	1
49	PU48370	Felt Ring			4-C	2
50	PU48371	Ring Drive Gear			4-C	1
51	REE7000	"E" Ring			4-B	1
52	YWS3003P	Setscrew			3-C	1
53	PUS46150B	Ring Drive Gear Ass'y	Incl. ㊻ to (52) and (78)		3-C	1
54	PU48362-2	Motor			2-F	1
55	PU48363	Worm			3-G	1
56	YFS2004	Setscrew			2-G	1
57	LPSP3006Z	Screw			3-G	3
58	PU32374	Housing			3-G	1
59	PU48364B	Worm Wheel Ass'y			3-G	1
60	Q03093-818	Washer			3-F, 3-F	3
61	PU48365	Cover			3-F	1
62	PU48366	Plate			3-F, 3-G	2
63	PU48367	Spacer			3-F	3
64	LPSP3025Z	Screw			3-H	3
65	LPSP3006Z	"			3-D, 2-E	3
66	LPSP4020Z	"			3-D	1
67	LPSP4012Z	"			2-E	1
68	SSSP4010Z	"			3-D	1
69	LPSP4010Z	"			3-F	1
70	Q03093-836	Washer			3-D	2
71	PUS36063C	Loading Ring Motor Ass'y	Incl. (54) and (57) to (64)		4-F	1
72	REE2500	"E" Ring			4-C, 5-D, 4-E	3
73	DPSP3012Z	Screw			2-D	1
74	WLS2300N	Lock Washer			3-C	4
75	PU48315A	Guide Roller Hold Ass'y			4-D	1
76	PU48314	Ring Guide Roller			4-D, 5-D, 4-E	3
77	PU48312A	Guide Roller Hold Ass'y			3-D	1
78	PU48369-2	Clutch Disk			4-C	1
79	PU53897A	Plate Ass'y			3-B	1
80	Q03093-829	Washer			4-A	1
81	Q03093-825	"			3-E	1
82	PU53892	Bracket			5-C	1
83	SPSP2310N	Screw			2-D	2
84	WLS2300N	Lock Washer			2-D	2
85	–	LED P.C.B.	See Sec. 8.27		4-C	1
86	LPSP3005Z	Screw			2-B	1
87	PU50570	Dew Sensor			2-B	1
88	Q03091-206	Washer			3-B	1
89	DPSP3006Z	Screw			2-C, 2-D	3
90	DPSP3006Z	"			1-B, 2-C	2
91	DPSP3010Z	"			2-D	1
92	DPSP3006Z	"			4-C	1
93	PU49485-3	Wire Clamp			3-B	1

7.2.6 Main deck assembly (3)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– Main deck assembly (3) list –

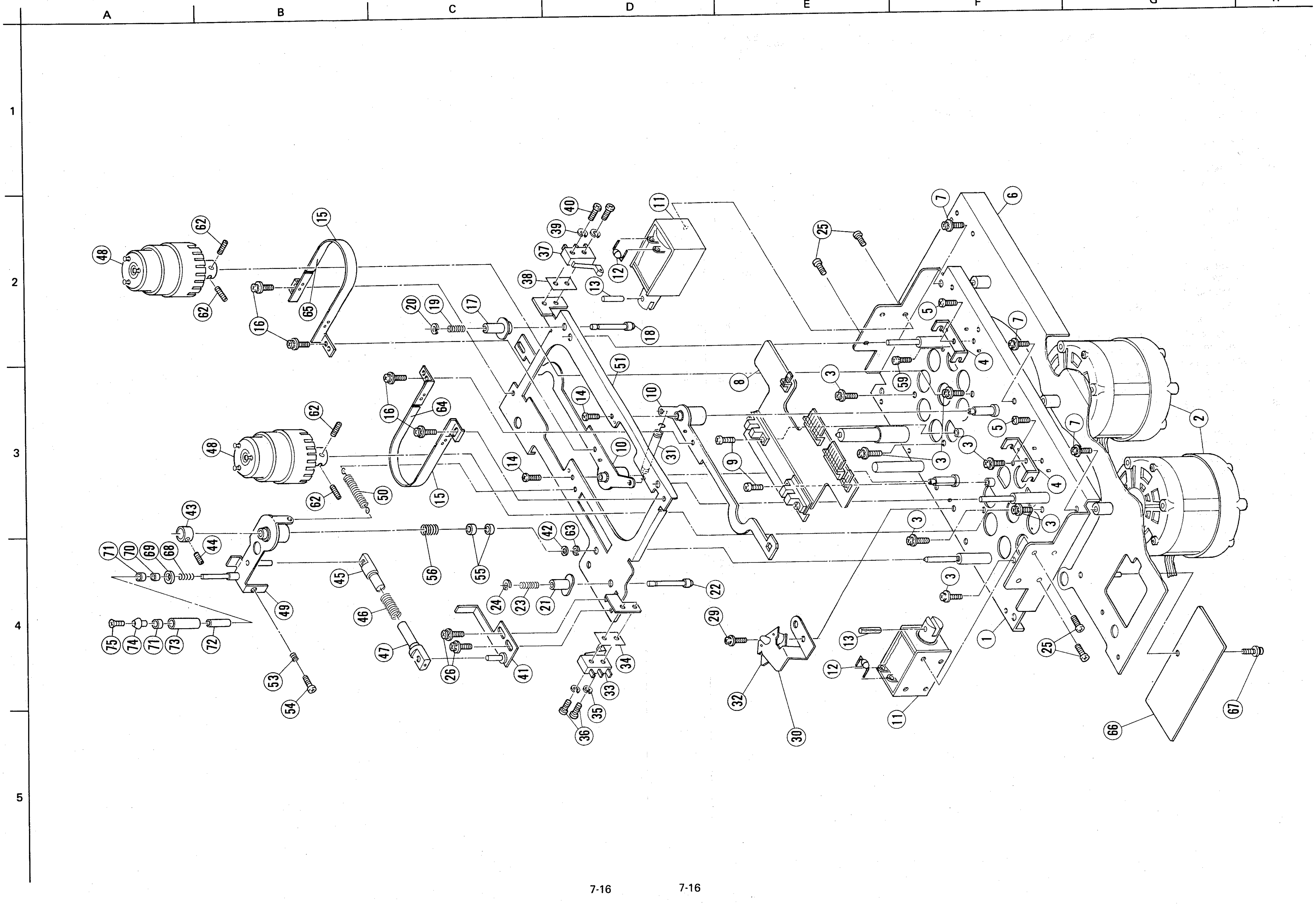
Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Main Deck Base			2-F	1
2	PU48332A	Return Pole Arm Mount Ass'y			4-E	1
3	PU48334	Return Pole Arm (1)			3-D	1
4	REE3000	"E" Ring			4-D, 4-E	2
5	PU48335	Return Pole Arm (2)			5-D	1
6	PU48337	Roller			4-E	1
7	PU40869	Collar			4-E	1
8	SDSP3010N	Screw			4-E, 5-E	2
9	PU48338	Bracket			4-E	1
10	PU48339	Stopper			5-E, 5-F	1
11	DPSP3006Z	Screw			3-B, 4-E, 5-E	3
12	PU48340	Bushing			5-E	1
13	PU48341	Lock Arm			5-E	1
14	Q03091-105	Washer			4-D, 5-E	2
15	PU48342	Connecting Pin			4-D	1
16	T30302-008	Collar			4-D	1
17	PU35005-109	Spring			5-D, 5-E	2
18	" -111	"			4-D	1
19	PU49673	Stud			3-D	1
20	PU30080-007	Spring			2-B	1
21	PU54853	Guide Pole			2-B	1
22	SDSP3006T	Screw			2-A	2
23	DPSP3008Z	"			3-E	1
24	PU48336	Tension Pole			5-D	1
25	–	–			–	–
26	LPSP4010Z	Screw			3-E	3
27	PU54853-2	Guide Pole			2-A, 2-B	1
28	PUM30002-40	Spring			2-B	1
29	PUM30018-8	Spacer			2-B	1
30	SDSP3010Z	Screw			4-G	1
31	PU48346	Lifter			2-E	1
32	PU48337	Roller			3-E	1
33	PU40869	Collar			2-E, 3-E	2
34	PU40868	Guide Roller			3-E	1
35	PU48343A	Bracket Ass'y			3-F	1
36	REE5000	"E" Ring			2-E	1
37	DPSP3010Z	Screw			2-E, 3-E	2
38	PU48309A	Motor Hang Plate Ass'y			3-E	1
39	LPSP4020Z	Screw			3-E	2
40	PU48303	Connecting Pin			3-D	2
41	LPSP4016Z	Screw			3-C, 4-C	3
42	PU48522-1-1	Shield Plate			3-D	1
43	PU48589A	Audio/Control Head Ass'y		□⊙	1-E	1
	PU48590A	"		★	2-E	1
44	–	Audio/Control Head Board	See Sec. 8.28		2-E	1
45	PU48421	Head Sliding Plate			1-E	1
46	PU30080-020	Spring			1-E	3
47	SPSP3012C	Screw			1-D, 2-D	3
48	PU32422	Audio Head Mounting Plate			1-D	1
49	DPSP3006T	Screw			1-D, 2-D	3
50	PU48422	G.P. Setting Angle			2-D	1
51	PU48423	Bearing Holder			1-D	1
52	PU45133-003	Ball Bearing			1-C	1
53	PU53929	Capstan Motor			3-G	1
54	PU34052A-1	Head Base Ass'y			2-B	1
55	PU48425	Shade			3-B	1

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
56	PU53915A	AD/FE Head Ass'y	(Full erase head only)	□ ◎	2-A	1
57	—	AD/FE Head Ass'y P.C.B.	See Sec. 8.40	□ ◎	2-A	1
58	SPSP3012C	Screw		□ ◎	2-A	3
59	PUM30002-57	Compression spring		□ ◎	2-A	3
60	—	—			—	—
61	PU48427	Protector Release			3-A	1
62	LPSP3012Z	Screw			1-C	3
63	Q03091-105	Washer			1-C	3
64	SPSP2604Z	Screw			2-A	1
65	PU48592A	Differential Trans. Ass'y			2-C	1
66	PU43981	Holder			1-B	2
67	LPSP3006Z	Screw			1-B, 4-B	1
68	QSM1S01-014	Microswitch	Pinch roller SW		1-B	1
69	PU44212	Spacer			1-B	1
70	SPSP2310Z	Screw			1-B	2
71	WLS2300N	Lock Washer			1-B	2
72	PUS25887-E	Lower Drum Ass'y		□	4-B	1
	″ -F	″		◎ ★	4-B	1
73	PU10247	Drum Base			4-C	1
74	PUS46157C	Drum Guide Roller Ass'y	Incl. (75) to (83)		5-B	1
75	PU48477	Guide Roller Shaft			5-C	1
76	PU30080-007	Spring			5-C	1
77	PU50756	Bearing Holder			5-C	1
78	Q03093-831	Washer			5-B	1
79	PU44093	Bearing			5-C	2
80	PU48479	Spacer			5-C	1
81	PU54862	Entrance Guide Roller			5-C	1
82	PU53888-3	Guide Flange			5-B	1
83	PU49276	Nylon Nut			5-B	1
84	WLS5000N	Lock Washer			4-D	1
85	NNS5000N	Nut			4-D	1
86	LPSP4010Z	Screw			3-D, 4-D	3
87	—	Holder	See Sec. 8.9 (Supply End Sensor)		2-A	1
88	—	Photo Transistor Board			2-A	1
89	—	Photo Transistor			2-A	1
90	PU49209	Shade			2-B	1
91	—	Drum Terminal	See Sec. 8.4		4-C	1
92	PU33682J	Upper Drum Ass'y		□	4-B	1
	″ K	″		◎ ★	4-B	1
93	LPSP4012C	Screw			3-A, 4-B	2
94	DPSP3006Z	″			—	1
95	—	Video Head Terminal	See Sec. 8.6		4-A	1
96	SPSP2006Z	Screw			4-A	2
97	—	Erase Head Terminal	See Sec. 8.7	□	4-A	1
98	PU48514	Spacer		□	4-A	2
99	SPSP2010Z	Screw		□	4-A	2
100	DPSP4008Z	″			1-D, 2-D	3
101	DPSP3008Z	″			4-D	1
102	PU30080-007	Spring			4-D	1
103	PU49672-4	Stop Ring			4-D	1
104	PU47199A	PU Head Ass'y			3-C	1
105	PU49322	PU Head Holder			3-C	1
106	SDSP2004N	Screw			3-C	1
107	PU41827C	Brush Ass'y			3-C	1
108	PU49323	Brush Holder			3-C	1
109	SPSP2002N	Screw			3-C	2
110	DPSP2606Z	″			2-C	2

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
111	DPSP3006Z	Screw			2-C	2
112	PU48074A	Ring Ass'y			4-D	1
113	PU49324	Stop Ring			4-D	1
114	YWS3003P	Setscrew			4-D	1
115	PUS46147A	Lifter Ass'y	Incl. (31) to (37)		2-F	1
116	PU53886	Stud			3-F	1
117	SPSP2004N	Screw			3-C	1
118	PU49570	Roller			4-D	1
119	PU49671	Sleeve			3-D	1
120	PU50490	Stop Ring			3-D	1
121	–	–			–	–
122	DPSP3014Z	Screw			3-D	1
123	SPSP2010Z	"			3-D	1
124	LPSP3008Z	"			5-D	1
125	DPSP3012Z	"			4-E	1
126	PU45648A	Wire Clamp Ass'y		□	3-A, 4-B	2
127	PU48337-2	Roller			4-D	1
128	PUM30002-40	Spring			3-F	1
129	PU53888	Guide Flange			3-E	1
130	DPSP3008Z	Screw			4-F	1
131	PU53894	Microswitch Holder			5-F	1
132	QSM1S01-023	Microswitch	Loading end zone SW		5-F	1
133	SPSP2310N	Screw			5-F	2
134	WNB4000N	Washer			3-A, 4-B	2
135	QXT665H-050	Vinyl Tabe			5-D	1
136	PUM30018-8	Spacer			3-E	1
137	Q03091-140	Washer			3-C, 4-C	3
138	PU43981	Holder			4-G, 5-G	3
139	LPSP3006Z	Screw			4-G, 5-G	5
140	PU54529	Stop Ring			3-E	1
141	PU53887	Guide Pole			3-E	1
142	SDSP3006T	Screw			3-E	1
143	LPSP3012Z	"			4-G	2
144	DPSP3006Z	"			2-A, 2-B	3
145	LPSP3006Z	"				2
146	DPSP3006Z	"			2-C	2
147	LPSP3006Z	"			1-B, 2-B, 2-C	3
148	PU53888	Guide Flange			2-A, 2-B	3
149	–	–			–	–
150	–	–			–	–

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ★ symbol: CP5550E only

7.2.7 Sub deck assembly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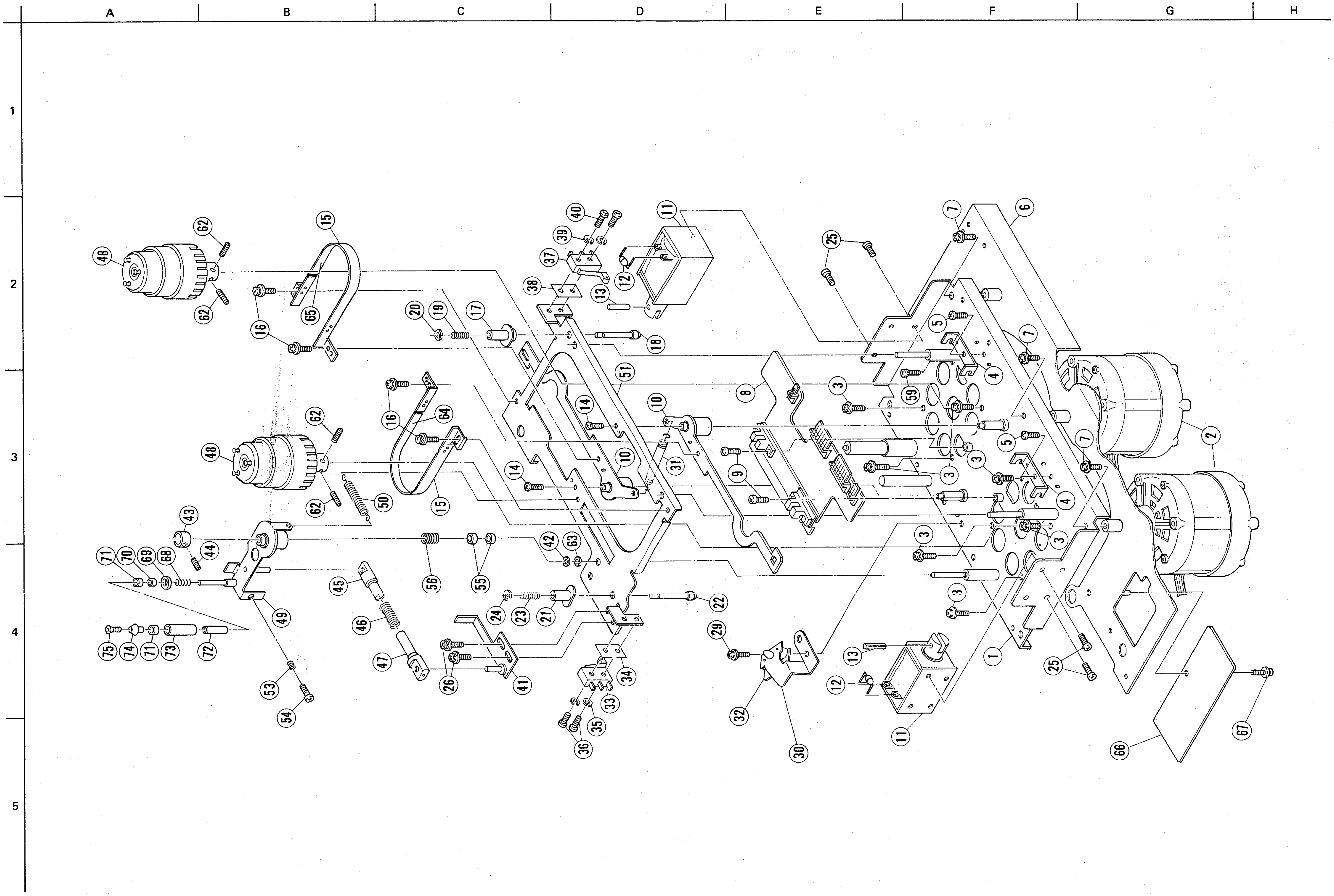
Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
111	DPSP3006Z	Screw			2-C	2
112	PU48074A	Ring Ass'y			4-D	1
113	PU49324	Stop Ring			4-D	1
114	YWS3003P	Setscrew			4-D	1
115	PUS46147A	Lifter Ass'y	Incl. ㉛ to ㊲		2-F	1
116	PU53886	Stud			3-F	1
117	SPSP2004N	Screw			3-C	1
118	PU49570	Roller			4-D	1
119	PU49671	Sleeve			3-D	1
120	PU50490	Stop Ring			3-D	1
121	—	—			—	—
122	DPSP3014Z	Screw			3-D	1
123	SPSP2010Z	"			3-D	1
124	LPSP3008Z	"			5-D	1
125	DPSP3012Z	"			4-E	1
126	PU45648A	Wire Clamp Ass'y		□	3-A, 4-B	2
127	PU48337-2	Roller			4-D	1
128	PUM30002-40	Spring			3-F	1
129	PU53888	Guide Flange			3-E	1
130	DPSP3008Z	Screw			4-F	1
131	PU53894	Microswitch Holder			5-F	1
132	QSM1S01-023	Microswitch	Loading end zone SW		5-F	1
133	SPSP2310N	Screw			5-F	2
134	WNB4000N	Washer			3-A, 4-B	2
135	QXT665H-050	Vinyl Tabe			5-D	1
136	PUM30018-8	Spacer			3-E	1
137	Q03091-140	Washer			3-C, 4-C	3
138	PU43981	Holder			4-G, 5-G	3
139	LPSP3006Z	Screw			4-G, 5-G	5
140	PU54529	Stop Ring			3-E	1
141	PU53887	Guide Pole			3-E	1
142	SDSP3006T	Screw			3-E	1
143	LPSP3012Z	"			4-G	2
144	DPSP3006Z	"			2-A, 2-B	3
145	LPSP3006Z	"				2
146	DPSP3006Z	"			2-C	2
147	LPSP3006Z	"			1-B, 2-B, 2-C	3
148	PU53888	Guide Flange			2-A, 2-B	3
149	—	—			—	—
150	—	—			—	—

□ symbol: CR-8250E only ⊚ symbol: CR-6650E only ★ symbol: CP5550E only

7.2.7 Sub deck assembly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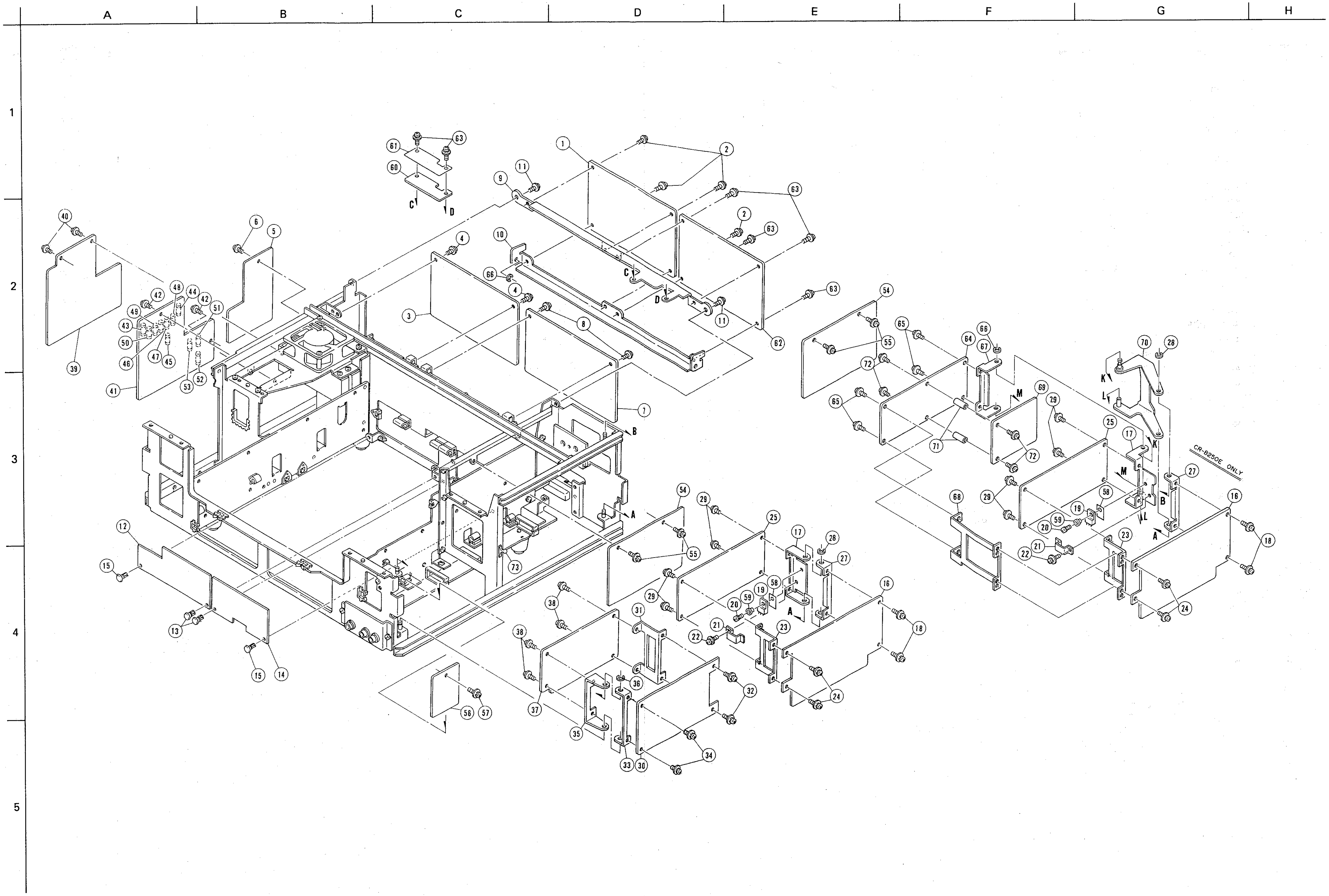
– Sub deck assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU20890B	Sub Deck			4-F	1
2	M574-00C	AC Motor			3-G	2
3	DPSP4010Z	Screw			3-E, 3-F, 4-F	7
4	PU48436	Board Holder			3-F	2
5	LPSP3006Z	Screw			2-F, 3-F	2
6	PU32418A	Sub Deck			2-F	1
7	DPSP4008Z	Screw			2-F, 3-G	3
8	–	Reel FG P.W.B. Ass'y	See Sec. 8.29		3-E	1
9	SPSP3010Z	Screw			3-E	2
10	PU48439A	Brake Arm Ass'y			3-D	2
11	PU48447	Brake Solenoid			2-D, 5-E	2
12	W03C	Diode			2-D, 4-E	2
13	PRE3010	Spring Pin			2-D, 4-E	2
14	LPSP2606Z	Screw			3-C, 3-D	2
15	PU48442A	Brake Band Ass'y			2-B, 3-C	2
16	DPSP3006Z	Screw			3-C	1
17	PU48448	Shaft Holder			2-C	1
18	PU48449	Shaft			2-D	1
19	PU30080-008	Spring			2-C	1
20	REE3000	"E" Ring			2-C	1
21	PU48448	Shaft Holder		□ ⊙	4-C	1
22	PU48449	Shaft		□ ⊙	4-D	1
23	PU30080-8	Spring		□ ⊙	4-C	1
24	REE3000	"E" Ring		□ ⊙	4-C	1
25	LPSP3006Z	Screw			2-E, 4-F	4
26	DPSP3006Z	"			4-C	2
27	–	–			–	–
28	–	–			–	–
29	DPSP3006Z	Screw			4-D	1
30	PU53920	Bracket				1
31	PU35005-115	Spring			3-D	1
32	–	LED P.C.B.	See Sec. 8.27		5-E	1
33	QSM1S02-023	Microswitch	Rec Safety SW	□ ⊙	4-D	1
34	PU44212	Spacer		□ ⊙	4-D	1
35	WLS2000N	Lock Washer		□ ⊙	5-D	2
36	SPSP2010Z	Screw		□ ⊙	5-D	2
37	QSM1S01-023	Microswitch	Cassette SW		2-C	1
38	PU44212	Spacer			2-C	1
39	WLS2000N	Lock Washer			2-D	2
40	SPSP2010Z	Screw			2-D	2
41	PU48380A	D.P. Holder Ass'y			4-C	1
42	Q03093-817	Washer			3-C	1
43	PU53918	Stop Ring			3-A	1
44	YES3003	Setscrew			4-B	1
45	PU48383	DP-1			4-B	1
46	PU48385	Compression Spring			4-B	1
47	PU48384	DP-2			4-C	1
48	PU32416B	Reel Disk	Incl: (62) Setscrew		2-A, 3-B	2
49	PU55028A	TU. Tension Arm Ass'y	Incl: (53) and (54)		4-B	1
50	PU35005-114	Spring			3-C	1
51	PU32415	Brake Guide Plate			3-D	1
52	–	–			–	–
53	PUM30002-57	Spring			4-B	1
54	PU55310	S. Bolt			4-B	1
55	PU48497	Bearing			4-C	2
56	PUM30002-43	Spring			4-C	1
57	–	–			–	–
58	–	–			–	–
59	LPSP4010Z	Screw			3-F	1
60	–	–			–	–
61	–	–				–
62	YWS3003P	W. Set Screw			2-B, 3-B	2
63	REE3000	"E" Ring			3-D	1
64	PU48446-1-1	Brake Shoe			3-C	1
65	PU48446-2	"			2-B	1
66	–	Reel Drive P.C.B. Ass'y	See Sec. 8.23		5-G	1
67	DPSP3008Z	Screw			5-G	1
68	PU30080-007	Compression Spring			4-A	1
69	PU53888-2	Guide Flange			4-A	1
70	PUM30005-20	Collar			4-A	1
71	PU44093	Bearing			4-A	2
72	PU53910-2	Spacer			4-B	1
73	PU53909-2	Roller			4-A	1
74	PU53911-2	Cap			4-A	1
75	SSSP2006Z	Screw			4-A	1

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.8 Frame assembly (1)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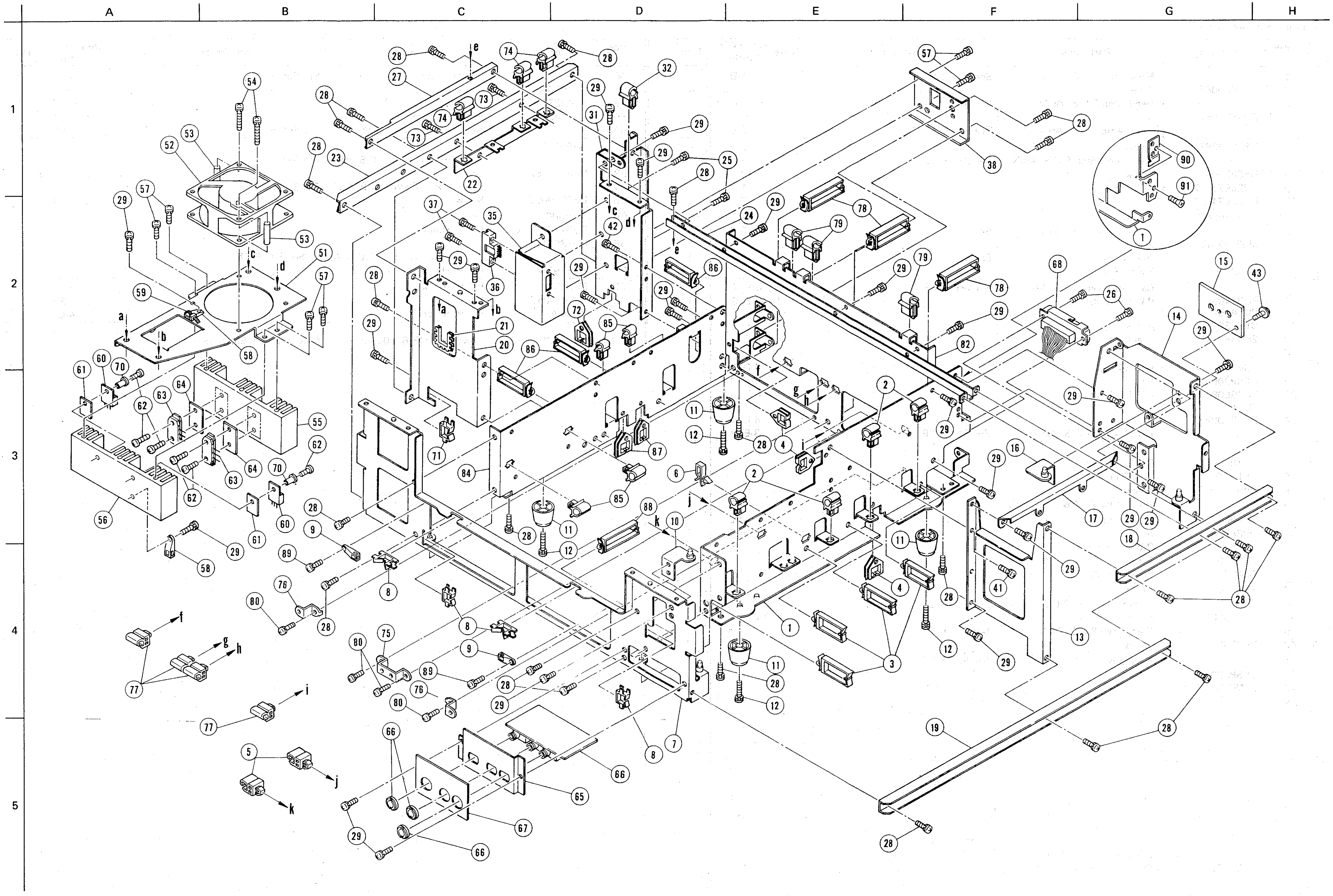
— Frame assembly list —

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	–	Modulator P.C.B. Ass'y	See Sec. 8.9		1-D	1
2	DPSP3008Z	Screw			1-E, 2-E	4
3	–	Head Amp P.C.B. Ass'y	See Sec. 8.10		2-C	1
4	DPSP3008Z	Screw		□	2-C	2
5	–	Erase Amp P.C.B. Ass'y	See Sec. 8.11	□	2-B	1
6	DPSP3008Z	Screw			2-B	1
7	–	P.B. Video Amp P.C.B. Ass'y	See Sec. 8.12		3-D	1
8	DPSP3008Z	Screw			2-D	2
9	PU20925-1-2	P.C.B. Holder			1-C	1
10	PU20924-1-1	"			2-C	1
11	DPSP3006Z	Screw			1-C, 2-D	2
12	–	Video Sub P.C.B. Ass'y	See Sec. 8.17		3-A	1
13	SPSP3008Z	Screw			4-A	1
14	–	Audio Trans. Ass'y	See Sec. 8.43		4-B	1
15	PU53276	Plastic Rivet			4-A, 4-B	2
16	–	Capstan Servo P.C.B. Ass'y	See Sec. 8.18		4-E, 3-G	1
17	PU32403	P.W.B. Holder		◎★	3-E, 3-G	1
	PU54769	"		□		1
18	DPSP3005Z	Screw			4-F, 3-H	2
19	2SD389AO	Transistor			4-E, 3-F	1
20	–	–				–
21	PU43335	Wire Clamp			4-D, 3-F	1
22	DPSP3008Z	Screw			4-D, 4-F	1
23	PU48608	P.W.B. Holder		◎★	4-E, 3-G	1
	PU54770	"		□		1
24	DPSP3008Z	Screw			4-E, 4-G	2
25	–	Drum Servo P.C.B. Ass'y	See Sec. 8.19		3-E, 3-G	1
26	–	–			–	–
27	PU48609	P.W.B. Holder			4-E, 3-G	1
28	REE3000	"E" Ring			3-E, 2-G	1
29	DPSP3006Z	Screw			3-D, 4-D, 3-F	4
30	–	Audio Rec. Amp & Erase P.C.B.	See Sec. 8.20	□ ◎	5-D	1
31	PU48608	P.W.B. Holder			4-D	1
32	DPSP3008Z	Screw			4-E	2
33	PU48600	P.W.B. Holder		□ ◎	4-D	1
34	DPSP3006Z	Screw		□ ◎	4-D	2
35	PU48601	P.W.B. Holder			4-D	1
36	REE3000	"E" Ring			4-D	1
37	–	Audio P.B. Amp P.C.B. Ass'y	See Sec. 8.21		4-C	1
38	DPSP3006Z	Screw			4-C, 4-D	4
39	–	Reel Servo P.C.B. Ass'y	See Sec. 8.22		2-A	1
40	DPSP3008Z	Screw			2-A	2
41	–	Regulator P.C.B. Ass'y	See Sec. 8.24		3-A	1
42	DPSP3008Z	Screw			2-A	2
43	QMF51A2-4R0	Fuse	(F1) (T4.0 A)		2-A	1
44	" -5R0	"	(F2) (T5.0 A)		2-A	1
45	" -1R25	"	(F3) (T1.25A)		2-A	1
46	" -1R0	"	(F4) (T1.0 A)		2-A	1
47	" -1R0	"	(F5) (")		2-A	1
48	" -1R25	"	(F6) (T1.25 A)		2-A	1
49	" -R63	"	(F7) (T0.63 A)	□ ◎	2-A	1
	" -R25	"	(") (T0.25 A)	★		
50	" -2R5	"	(F8) (T2.5 A)		2-A	1
51	" -R63	"	(F9) (T0.63 A)		2-B	1
52	" -R63	"	(F10) (")		–	1
53	" -R40	"	(F11) (T0.4 A)		–	1
54	–	System CTL P.C.B. Ass'y	See Sec. 8.25		3-D, 2-E	1
55	DPSP3008Z	Screw			4-D, 2-E	2
56	–	Syscon Drive P.C.B. Ass'y	See Sec. 8.26		4-C	1
57	DPSP3008Z	Screw			4-C	1
58	PU45375	Insulator			4-E, 3-G	1
59	PU41624-6	Isolation Washer			4-E, 3-F	1
60	–	ACC Field Memory Ass'y	See Sec. 8.14		1-C	1
61	PU55161	Insulator			1-C	1
62	–	Color Process Amp P.C.B. Ass'y	See Sec. 8.13		2-E	1
63	DPSP3006Z	Screw			1-C, 1-E, 2-E	6
64	–	Color Frame Servo P.C.B. Ass'y	See Sec. 8.15		2-F	1
65	DPSP3006Z	Screw			2-E, 3-E	2
66	REE3000	"E" Ring			2-C, 2-F	1
67	PU54771	P.C.B. Holder		□	2-F	1
68	PU33981	"		□	3-F	1
69	–	Color Frame Warning P.C.B. Ass'y	See Sec. 8.16	□	3-F	1
70	PU33978A	P.C.B. Holder Ass'y		□	2-G	1
71	PU55330	P.C.B. Bracket		□	3-F	2
72	SPSP3006Z	Screw		□	2-E, 3-F	
73	PU54861	P.C.B. Spacer		□	4-C	

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.9 Frame assembly (2)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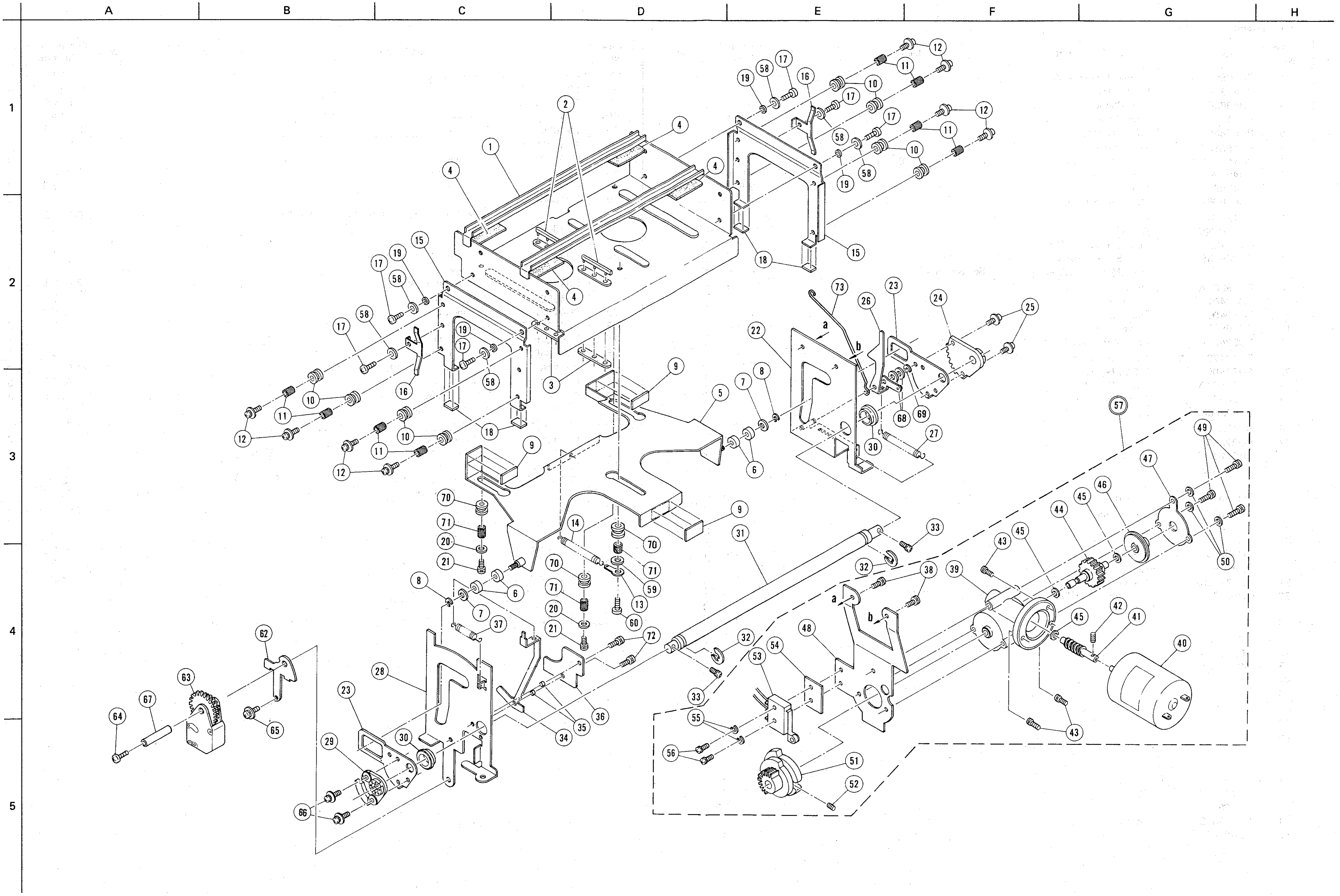
– Frame assembly (2) list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU10591A-1	Frame (Right) Ass'y	Incl. ② and ⑥		4-E	1
2	PU47876	P.C.B. Holder			3-E	2
3	PU48634	Wire Clamp			4-E	1
4	PU44157	Edge Cover			3-E, 4-E	2
5	PU53865	P.C.B. Holder			5-B	2
6	PU48016-2	Mini Clamp			3-D	1
7	PU10257B-2	Front Plate Ass'y	Incl. ⑧, ⑨, (88) and (89)		5-D	1
8	PU48086	Edge Saddle			4-C, 5-D	4
9	PU43981	Holder			3-B, 4-C	2
10	PU48606A	Upper Arm Ass'y			3-D	1
11	PU48624	Fut			3-D, 3-E, 4-E	4
12	LPSP3020Z	Screw			3-D, 4-D, 4-E, 4-F	4
13	PU32402-1-1	Central Bracket (Right)			4-F	1
14	PU20913B	Rear Bracket Ass'y			2-G	1
15	–	Hour Meter P.C.B. Ass'y	See Sec. 8.40		2-G	1
16	PU48605A	Upper Arm Ass'y			3-F	1
17	PU32404	P.C.B. Holder			3-G	1
18	PU32400	Upper Stay			3-G	1
19	PU20923	Lower Stay			5-F	1
20	PU32401	Central Bracket (Left)			2-C	1
21	PU43172-1-100	Nylon Grommet			2-C	1
22	PU32405	P.C.B. Holder			1-C	1
23	PU21527A	Lower Stay Ass'y	Incl. ㉒, (73) and (74)		1-B	1
24	PU20921	Top Stay			2-E	1
25	LPSP3006Z	Screw		⊚ ★	1-D	2
26	SPSP2610N	"			2-G	2
27	PU32399	Upper Stay			1-C	1
28	LPSP4006Z	Screw				27
29	LPSP3006Z	"				26
30	–	–			–	–
31	PU20916B	Rear Bracket			1-D	1
32	PU47876	P.C.B. Holder			1-D	1
33	–	–			–	–
34	–	–			–	–
35	PU48610	Cover		⊚ ★	2-C	1
36	PU45160	Connector		⊚ ★	2-C	1
37	LPSP3010Z	Screw		⊚ ★	2-C	2
⚠ 38	PU50125	AC Connector Plate	See Sec. 7.2.17		1-F	1
39	–	–			–	1
40	–	–			–	2
41	LPSP3004Z	"			4-F	1
42	LPSP3004Z	"			2-D	1
43	DPSP3006Z	"			2-H	1
44	–	–			–	–
45	–	–			–	–
46	–	–			–	–
47	–	–			–	–
48	–	–			–	–
49	–	–			–	–
50	–	–			–	–
51	PU32408	Fan Bracket			2-B	1
52	PU46564-3	Fan Motor			1-A	1
53	PU48641	Bushing			1-A, 2-B	2
54	LPSP3030Z	Screw			1-B	2
55	PU49187	Heat Sink			3-B	1
56	PU49188	Heat Sink			3-A	1
57	LPSP4008Z	Screw			1-A, 2-B, 1-F	4
58	PU43981	Holder			2-B, 4-B	5
⚠ 59	PU43192-4	Binder			2-A	8
60	2SD860AQ	Transistor			2-A, 3-B	2
61	PU45375-4	Insulator			2-A, 3-B	2
62	DPSP3010Z	Screw			3-A, 3-B	6
63	2SD745	Transistor			3-A, 3-B	2
64	PU55169	Insulator			3-A, 3-B	2
65	PU48602-1-2	Jack Holder			5-D	1
66	–	Mic/Headphone P.C.B. Ass'y	See Sec. 8.30		5-C, 5-D	1
67	PU48664	Sheet		□ ⊚	5-C	1
	" -2	"		★	5-C	1
68	PU44246	Remote Connector Ass'y			2-F	1
69	LPSP4008Z	Screw			–	2
70	PU41624-6	Isolation Washer			2-A, 3-B	2
71	PU48086	Edge Saddle			3-C	1
72	PU44157	Edge Cover			2-D	2
73	LPSP3006Z	Screw			1-C	2
74	PU47876	P.C.B. Support			1-C	3
75	PU53860	P.C.B. Bracket (1)			4-C	1
76	PU53861	" (2)			4-B, 2-C	2
77	PU53865	P.C.B. Holder			4-A, 5-B	3
78	PU48634	Wire Clamp			2-E, 2-F	3
79	PU47876	P.C.B. Holder			2-E, 2-F	3
80	LPSP3006Z	Screw			4-B, 4-C	4
81	PU44157	Edge Cover			–	2
82	PU21507A-4	Rear Plate Ass'y	Incl. (75) to (81)		2-F	1
83	PU53865	P.C.B. Holder			–	1
84	PU10598A-2	Frame (Left) Ass'y	Incl. (85) to (87)		3-C	1
85	PU47876	P.C.B. Holder			2-D, 3-D	4
86	PU48634	Wire Clamp			2-C, 2-D	3
87	PU44157	Edge Cover			3-D	2
88	PU48634	Wire Clamp			3-D	1
89	LPSP3006Z	Screw			4-B, 4-C	2
90	PU54766	Connector Holder			1-G	1
91	SSSP2606Z	Screw			1-G	1
92	PU43172-45	Nylon Grommet			1-H	1

□ symbol: CR-8250E only ⊚ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.10 Cassette housing assembly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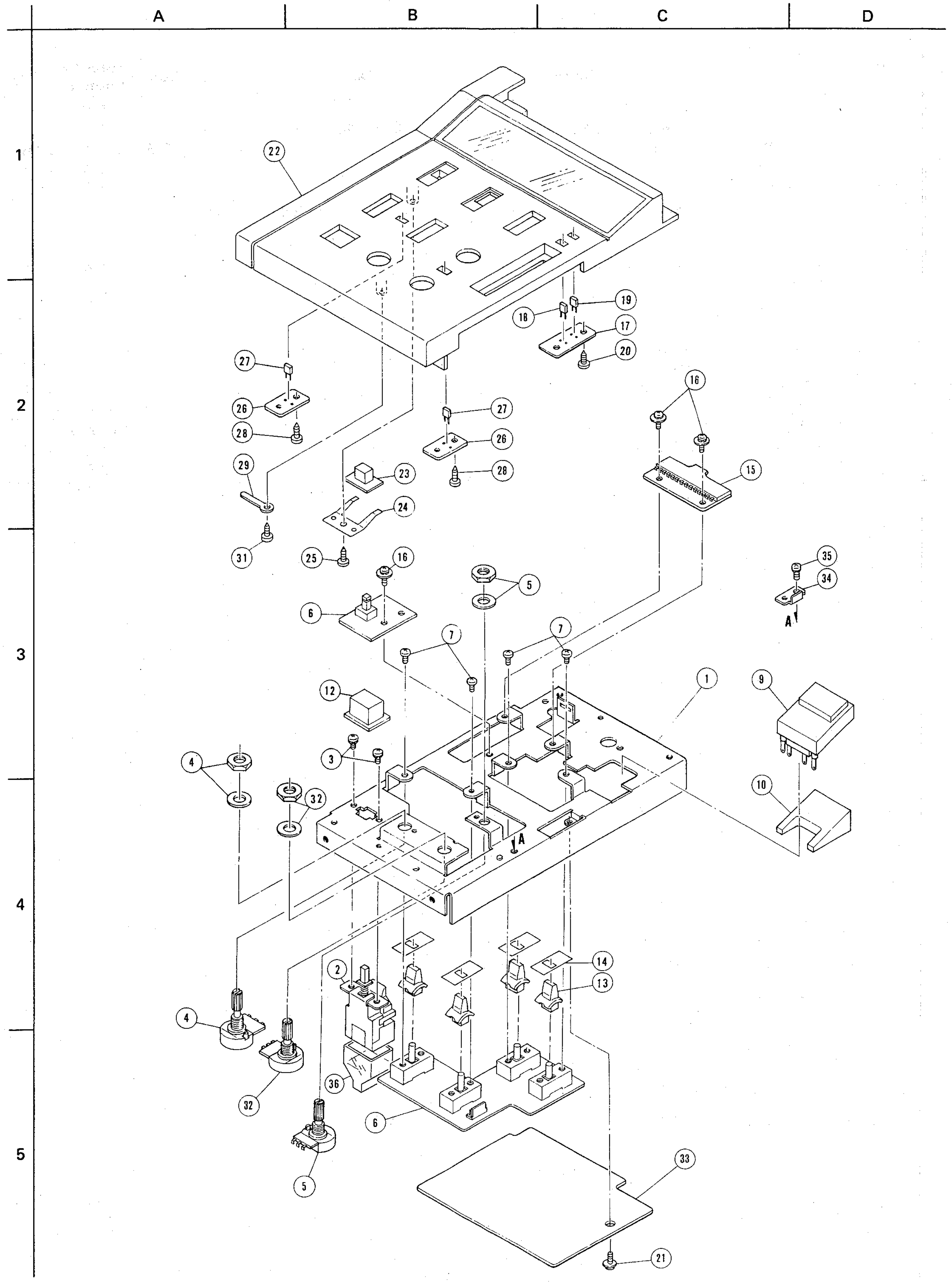
– Cassette compartment assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU20829A	Cassette Compartment			1-C	1
2	PU40862	Cassette Guide			1-D	2
3	PU48682	Lining Plate			3-C	2
4	PU48418-5	Felt Sheet			1-C, 1-D, 2-D	4
5	PU20894A	Sliding Plate Ass'y			3-D	1
6	PU48461	Roller			4-C, 3-E	4
7	Q03093-819	Washer			4-C, 3-E	2
8	REE3000	"E" Ring			4-C, 2-E	2
9	PU48418-2	Felt Sheet			3-C, 2-D, 3-E	3
10	PU40868	Guide Roller			3-B, 3-C, 1-E, 1-F	8
11	PU40869	Collar			1-F, 3-B, 3-C	4
12	DPSP3010Z	Screw			3-B, 1-F	8
13	50242-2	Lug			4-D	1
14	PU35005-112	Spring			3-D	1
15	PU48462	Guide Roller Plate			2-C, 2-E	2
16	PU48463	Sliding Contact			3-C, 1-E	2
17	SDBP3004M	Screw			2-B, 2-C, 1-E	6
18	PU48418-3	Felt Sheet			3-C, 2-E	4
19	T30302-006	Collar			2-C, 1-E	4
20	WNS3000Z	Washer			3-C, 4-D	2
21	SDBP3004M	Screw			4-C, 4-D	2
22	PU48464A	Guide Plate (R) Ass'y			2-E	1
23	PU48687	Eject Arm			4-B, 2-E	1
24	PU48468	Drive Gear			2-F	1
25	LPSP3006Z	Screw			2-F	2
26	PU48470A-1	Lock Arm Ass'y			2-E	1
27	PU35005-58	Spring			3-F	1
28	PU48484-1-1	Guide Plate (L)			4-C	1
29	PU33710	Gear Plate			5-B	1
30	PU48481	Bearing			5-C, 3-E	2
31	PU32424	Connecting Rod			3-E	1
32	REE8000	"E" Ring			4-E	2
33	LPSP3016Z	Screw			4-D, 3-F	2
34	PU48473	Slide Lever			5-D	1
35	T30302-004	Collar			5-D	2
36	PU48474	Guide Plate			4-D	1
37	PU35005-113	Spring			4-C	1
38	LPSP3004Z	Screw			4-F	2
39	PU32374	Housing			4-F	1
40	PU48362-2	Motor			4-G	1
41	PU48363	Worm Gear			4-G	1
42	YFS2004	Setscrew			4-G	1
43	LPSP3006Z	Screw			3-F, 5-F	3
44	PU48364A	Worm Wheel Ass'y			3-F	1
45	Q03093-818	Washer			3-F, 4-G	3
46	PU48365	Cover			3-G	1
47	PU48366	Plate			3-G	1
48	PU48475	Side Plate			4-E	1
49	LPSP3025Z	Screw			3-G	3
50	WSS3000Z	Washer			4-G	3
51	PU48476A	Drive Gear			5-E	1
52	YWS3003P	Setscrew			5-E	1
53	QSM1S01-023	Microswitch	Cassette Compartment SW		4-E	1
54	PU44212	Spacer			4-E	1
55	WLS2000N	Lock Washer			4-D	2
56	SPSP2010Z	Screw			5-D	2
57	PUS36064B	Compartment Motor Ass'y	Incl. ㊴ to (56) and (68) to (73)		3-G	1
58	WNB3000N	Washer			2-B, 2-C, 3-C, 1-E	6
59	Q03091-106	"			4-D	1
60	SDBP3010M	Screw			4-D	1
61	PUS25861B	Cassette Compartment Ass'y	Incl. ① to ㊲, and (58) to (60) and (62) to (72)			1
62	PU53921	Damper Holder			4-B	1
63	PU53922	Damper Holder Ass'y			4-A	1
64	SDBP2615M	Screw			5-A	1
65	DPSP3006Z	"			5-B	1
66	LPSP3006Z	"			5-B	2
67	PU54289	Spacer			4-A	1
68	Q03093-819	Washer			3-E	2
69	REE3000	"E" Ring			3-F	1
70	PU40868	Guide Roller			3-C, 3-D, 4-D	3
71	PU40869	Collar			3-C, 4-D	3
72	LPSP3006Z	Screw			4-D	2
73	PU53923	Rod			2-E	1

7.2.11 Left control assembly

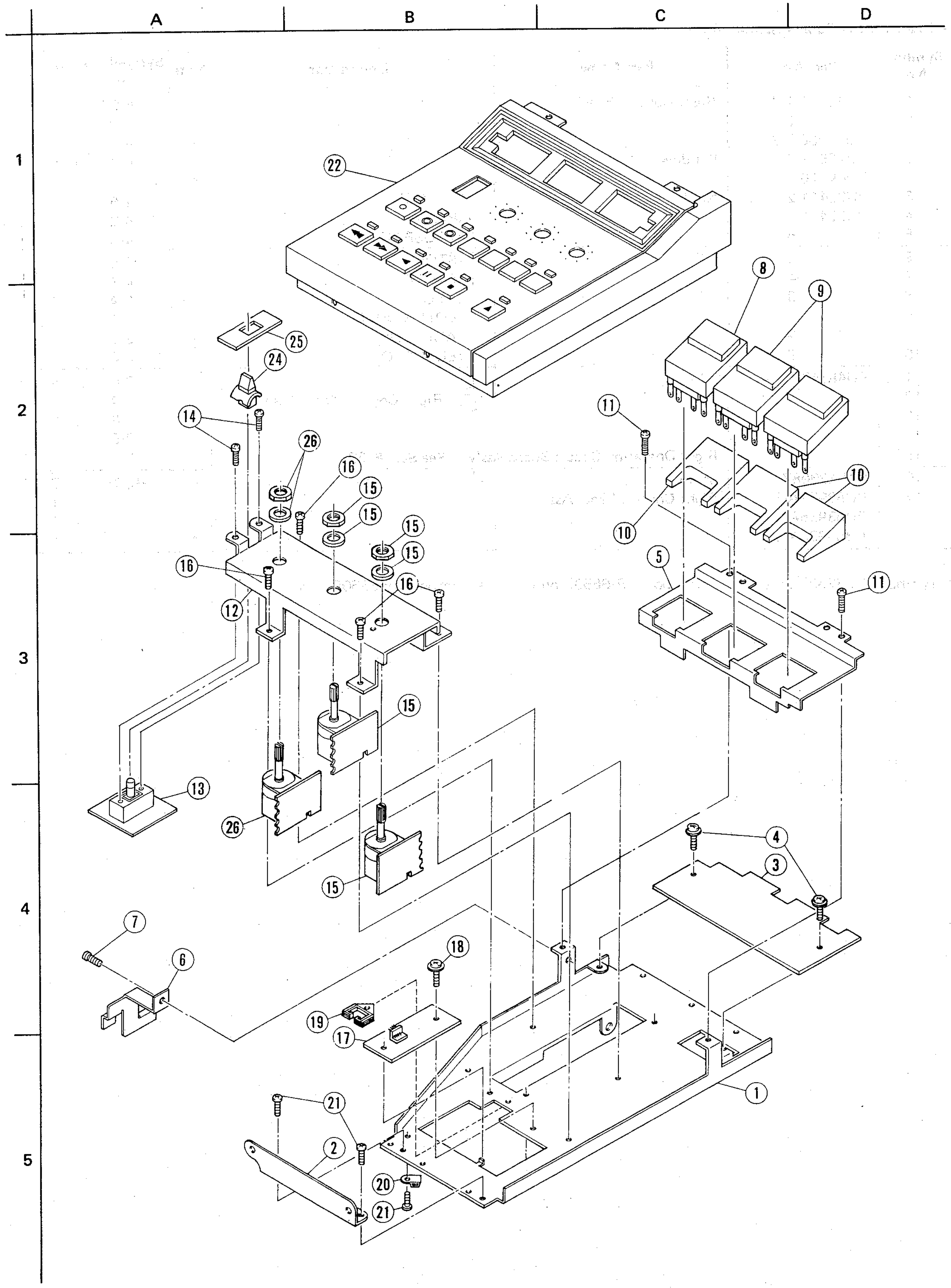


– Left control assembly –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU21440-1-3	Left Control Plate			3-C	1
⚠ 2	QSP2111-011	Push Switch	POWER		4-B	1
⚠ 3	LPSP3006Z	Screw			3-B	2
4	QVF1A2B-123	Volume	SKEW VR		3-A, 4-A	1
5	PU48636-2	"	TRACKING VR		3-B, 5-B	1
6	–	Left Operation P.C.B. Ass'y	See Sec. 8.31		3-B, 5-B	1
7	SPSP2604Z	Screw			3-B, 3-C	4
8	DPSP3006Z	"			–	1
9	PU53866-3-1	Meter			3-C	1
10	PU53862	Meter Cushion			4-C	1
11	–	–			–	–
12	PU48653	Knob			3-B	1
13	PU48648	"			4-C	4
14	PU48650-3	Plate			4-C	4
15	–	FIP P.C.B. Ass'y	See Sec. 8.38		2-C	1
16	DPSP3006Z	Screw			3-B, 2-C	2
17	–	LED P.C.B.	See Sec. 8.2		2-C	1
18	–	LED	"		2-B	1
19	–	"	"		2-C	1
20	SBSA3006Z	Screw			2-C	1
21	DPSP3006Z	"			5-C	1
22	PU54308A-1	Left Control Panel Ass'y	Incl. ㉓ to ㉕ and ㉙	□ ◎	1-A	1
	PU54341A-1	"		★	1-A	1
23	PU48654	Knob			2-B	1
24	PU48613	Spring			2-B	1
25	SBSA3006Z	Screw			3-B	1
26	–	LED P.C.B.	See Sec. 8.3		2-A, 2-B	2
27	–	LED	"		2-A, 2-B	2
28	SBSA3008Z	Screw			2-A, 2-B	2
29	PU49485-3	Wire Clamp			2-A	1
30	–	–			–	–
31	–	–			3-A	–
32	PU53960	Volume	H-PHASE VR		5-A, 4-B	1
33	–	Reel Safety P.C.B. Ass'y	See Sec. 8.36.		5-C	1
34	PU54794	Lever Stopper			3-D	1
35	LPSP3006Z	Screw			3-D	1
⚠ 36	PU49885	Switch Cover			5-B	1

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.12 Right control panel assembly

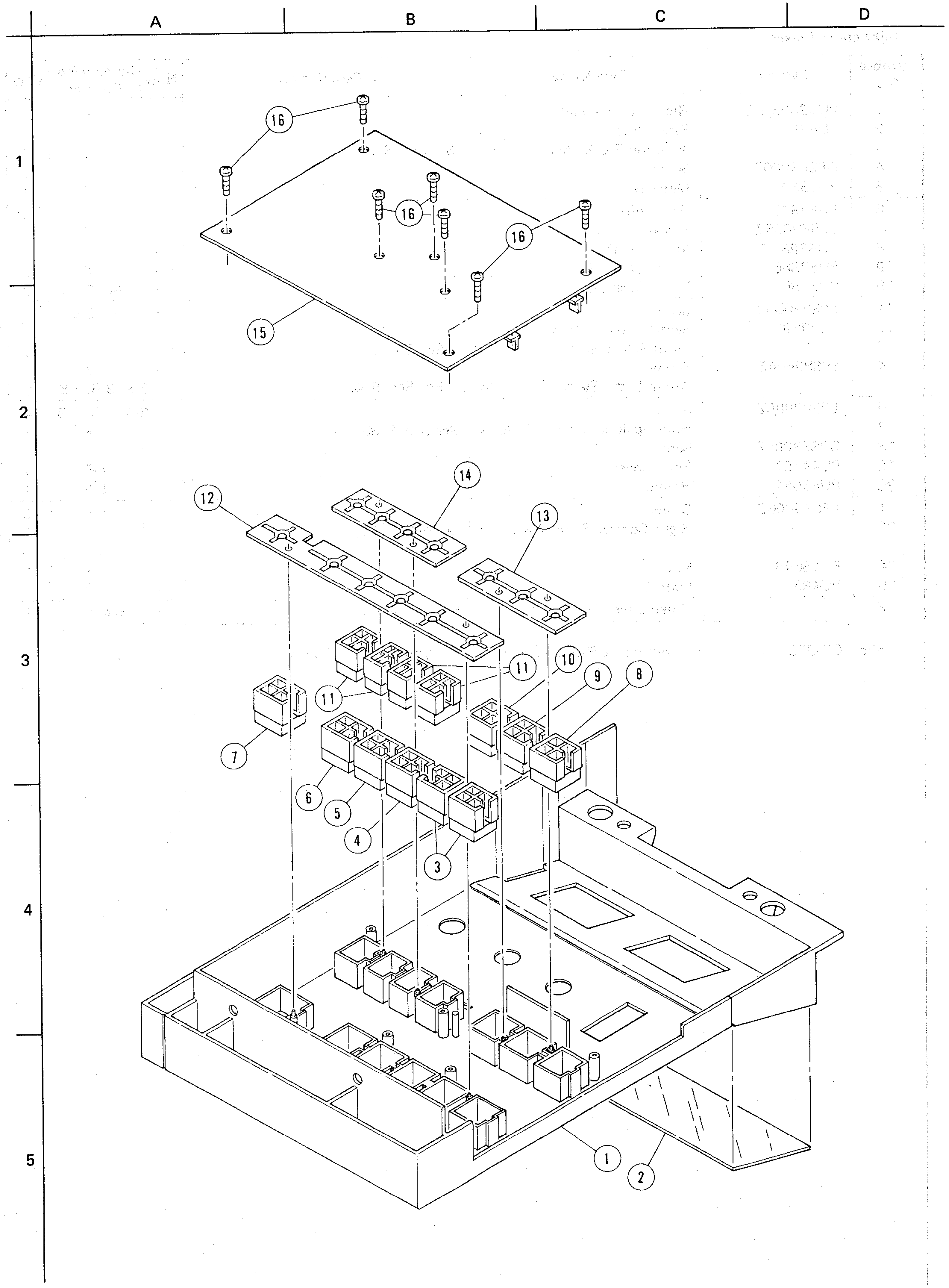


– Right control assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU32398-1-2	Right Control Plate			5-C	1
2	PU48691	Panel Bracket			5-B	1
3	–	Junction P.C.B. Ass'y	See Sec. 8.39		4-C	1
4	DPSP3006Z	Screw			4-C	2
5	PU33695	Meter Rest		□ ⊙	3-C	1
6	PU53876	Rod Holder			4-A	1
7	LPSP3006Z	Screw			4-A	1
8	PU53866-2	Meter (VIDEO)		□ ⊙	1-C	1
9	PU53866	" (AUDIO)		□ ⊙	2-D	2
10	PU53862	Meter Cushion		□ ⊙	3-C, 2-D	3
11	LPSP3006Z	Screw		□ ⊙	2-C, 3-D	2
12	PU33696	Switch Holder Ass'y		□ ⊙	3-A	1
13	–	Input Select Switch P.C.B. Ass'y	See Sec. 3.35	□ ⊙	4-A	1
14	SPSP2604Z	Screw		□ ⊙	2-A	2
15	–	Audio Limit Switch P.C.B. Ass'y	See Sec. 8.42	□ ⊙	2-B, 3-B, 4-B	2
16	LPSP3006Z	Screw		□ ⊙	3-A, 2-B, 3-B	4
17	–	Housing Junction P.C.B. Ass'y	See Sec. 8.33		5-B	1
18	DPSP3006Z	Screw			4-B	1
19	PU44157	Edge Cover			4-B	1
20	PU43981	Holder			5-B	1
21	LPSP3006Z	Screw			5-B	3
22	–	Right Control Panel Ass'y	See Sec. 7.13		1-B	1
23	–	–			–	–
24	PU48648	Knob		□ ⊙	2-A	1
25	PU48650	Plate-3		□ ⊙	2-B	1
26	–	Video Level Ass'y	See Sec. 8.45	□ ⊙	4-A, 2-B	1

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.13 Right control panel assembly

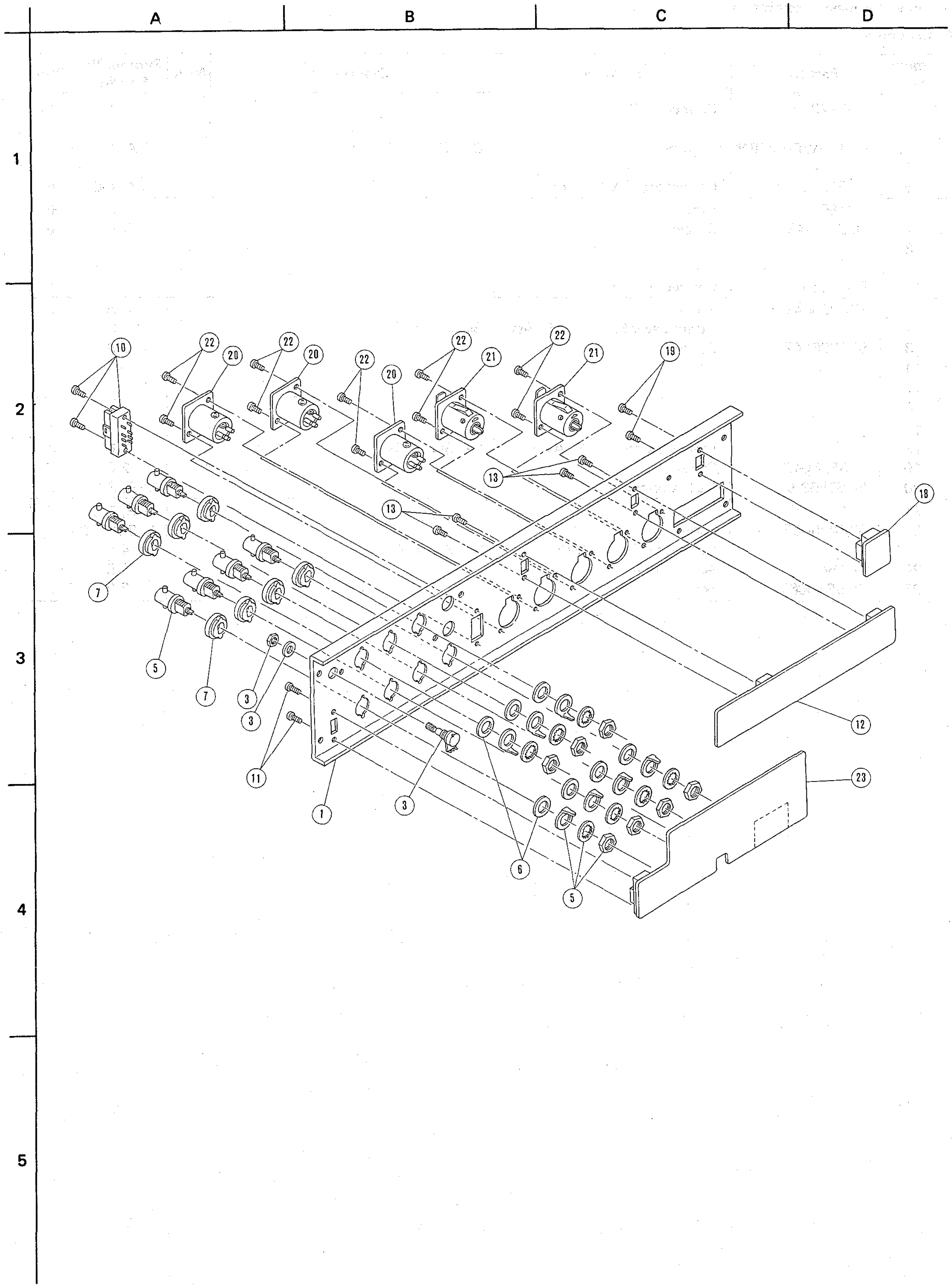


– Right control Panel assembly list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU10577-1-3	Right Control Panel		□	5-C	1
	" -2-3	"		⊙	5-C	1
	PU10260-7-2	"		★	5-C	1
2	PU48651-2	Window		□⊙	5-C	1
	PU49210	"		★	5-C	1
3	PU32411-2	Knob	(FF, REW)		4-B	2
4	PU32411	"	(PLAY)		4-B	1
5	" -5	"	(PAUSE/STILL)		4-B	1
6	" -6	"	(STOP)		4-B	1
7	" -4	"	(EJECT)		4-B	1
8	" -3	"	(REC)	□⊙	3-A	1
9	" -7	"	(EDIT START)	□	3-C	1
	" -9	"	(AUD-1 DUB)	⊙	3-C	1
10	" -8	"	(EDIT STOP)	□	3-C	1
11	PU48647	"		□	3-B	4
12	–	–	⑰ Right Control Panel Ass'y		2-A	–
13	–	–			2-B	–
14	–	–			2-B	–
15	–	Right Operation Circuit Board Ass'y	See Sec. 8.32		2-A	1
16	SPSA2608Z	Screw			1-A, 1-B	7
17	PU53934A-1	Right Control Panel Ass'y		□		1
	PU53935A-1	"		⊙		1
	PU53936A-1	"		★		1

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.14 Connector panel assembly (CR-8250E)



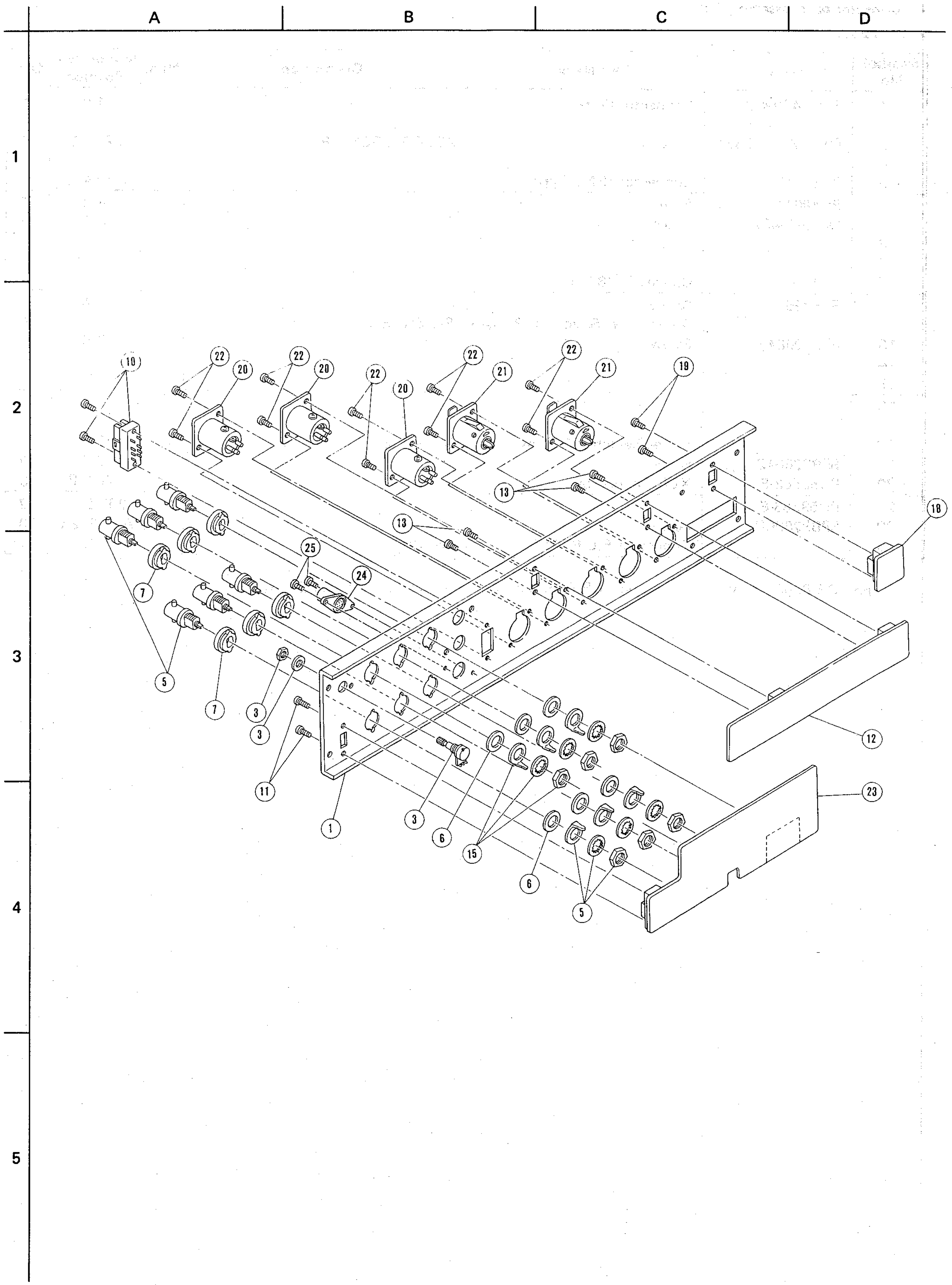
– Connector panel assembly list –

- CR-8250E

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU21439-4-2	Connector Plate			4-B	1
2	–	–			–	–
3	QVF1A2B-123BM	Volume	COLOR LOCK VR		3-A, 4-B	1
4	–	–			–	–
5	PU51213	Connector (BNC Type)			3-A, 4-C	7
6	PU48611	Ring			4-B	7
7	Q03093-439	Spacer			3-A	7
8	–	–			–	–
9	–	–			–	–
10	PU51214	Connector (8 Pin)			2-A	1
11	SPBP2604Z	Screw –			3-A	2
12	–	Audio Level Select P.C.B. Ass'y	See Sec. 8.34		3-D	1
13	SPBP2604R	Screw			2-B	4
14	–	–			–	–
15	–	–			–	–
16	–	–			–	–
17	–	–			–	–
18	–	Frame Switch P.C.B. Ass'y	See Sec. 8.44		2-D	1
19	SPBP2604Z	Screw			2-C	2
20	PU53563-5	XLR Connector			2-A, 2-B	3
21	PU53563-6	"			2-B, 2-C	2
22	SPBP2606R	Screw			2-A, 2-B, 2-C	10
23	–	Connector P.C.B. Ass'y	See Sec. 8.46		3-D	1

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ★ symbol: CP-5550E only

7.2.15 Connector panel assembly (CR-6650E)

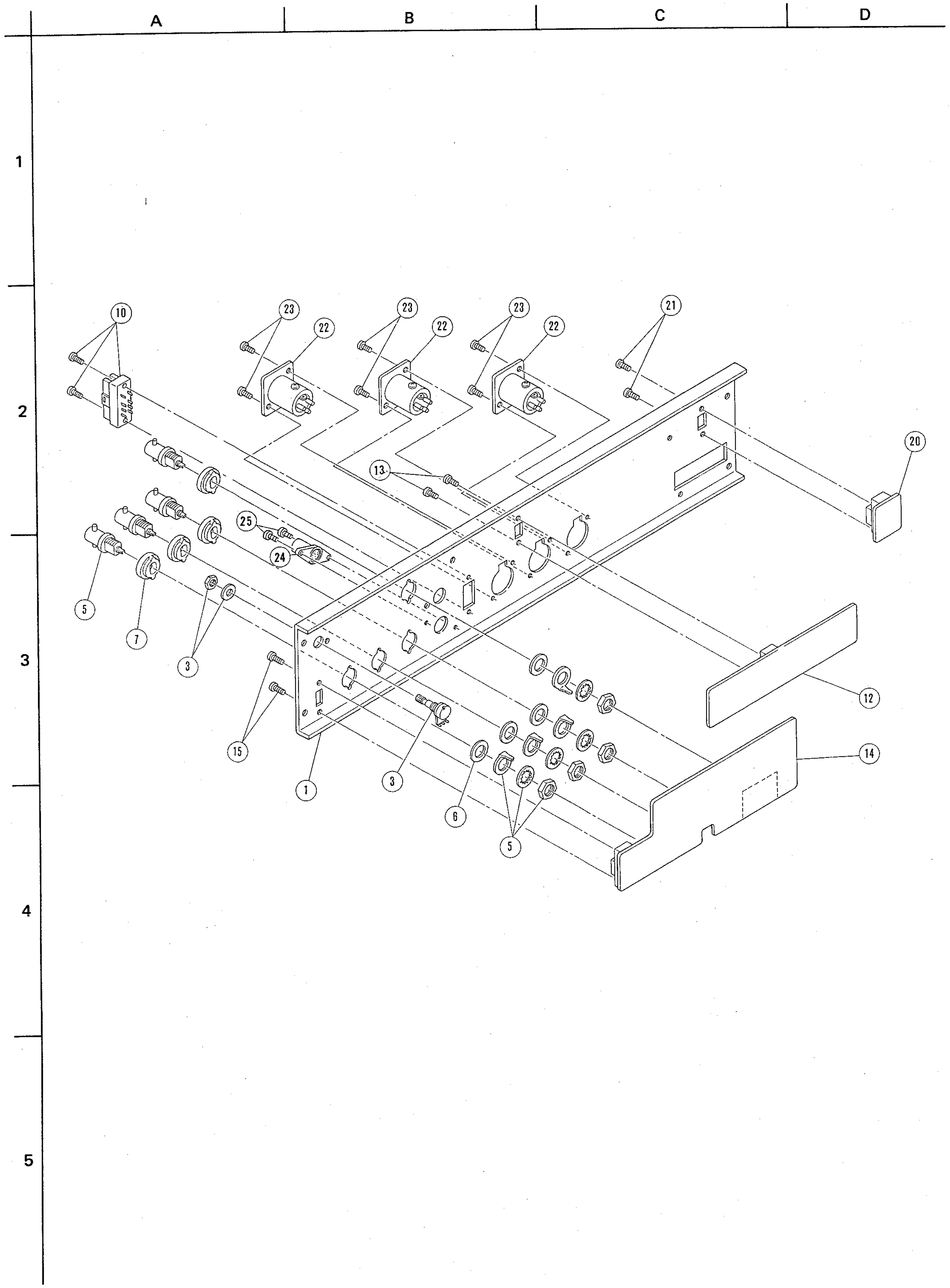


– Connector panel assembly list –

- CR-6650E

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU21439-5-2	Connector Plate			4-B	1
2	–	–			–	–
3	QVF1A2B-123BM	Volume	COLOR LOCK VR		3-A, 4-B	1
4	–	–			–	–
5	PU51213	Connector (BNC Type)			3-A, 4-C	6
6	PU48611	Ring			4-B	6
7	Q03093-439	Spacer			3-A	6
8	–	–			–	–
9	–	–			–	–
10	PU51214	Connector (8 Pin)			2-A	1
11	SPBP2604Z	Screw			4-A	2
12	–	Audio Level Select P.C.B. Ass'y	See Sec. 8.34		3-D	1
13	SPBP2604Z	Screw			2-B	4
14	–	–			–	–
15	–	–			4-B	–
16	–	–			–	–
17	–	–			–	–
18	–	Frame Switch P.C.B. Ass'y	See Sec. 8.44		2-D	1
19	SPBP2604Z	Screw			2-C	2
20	PU53563-5	XLR Connector			2-A, 2-B	3
21	″ -6	″			2-B, 2-C	2
22	SPBP2606R	Screw			2-A, 2-B, 2-C	10
23	–	Connector P.C.B. Ass'y	See Sec. 8.46		4-D	1
24	PU46471	Aerial Connector			3-B	1
25	SDBP3006M	Screw			3-B	2

7.2.16 Connector panel assembly (CP-5550E)

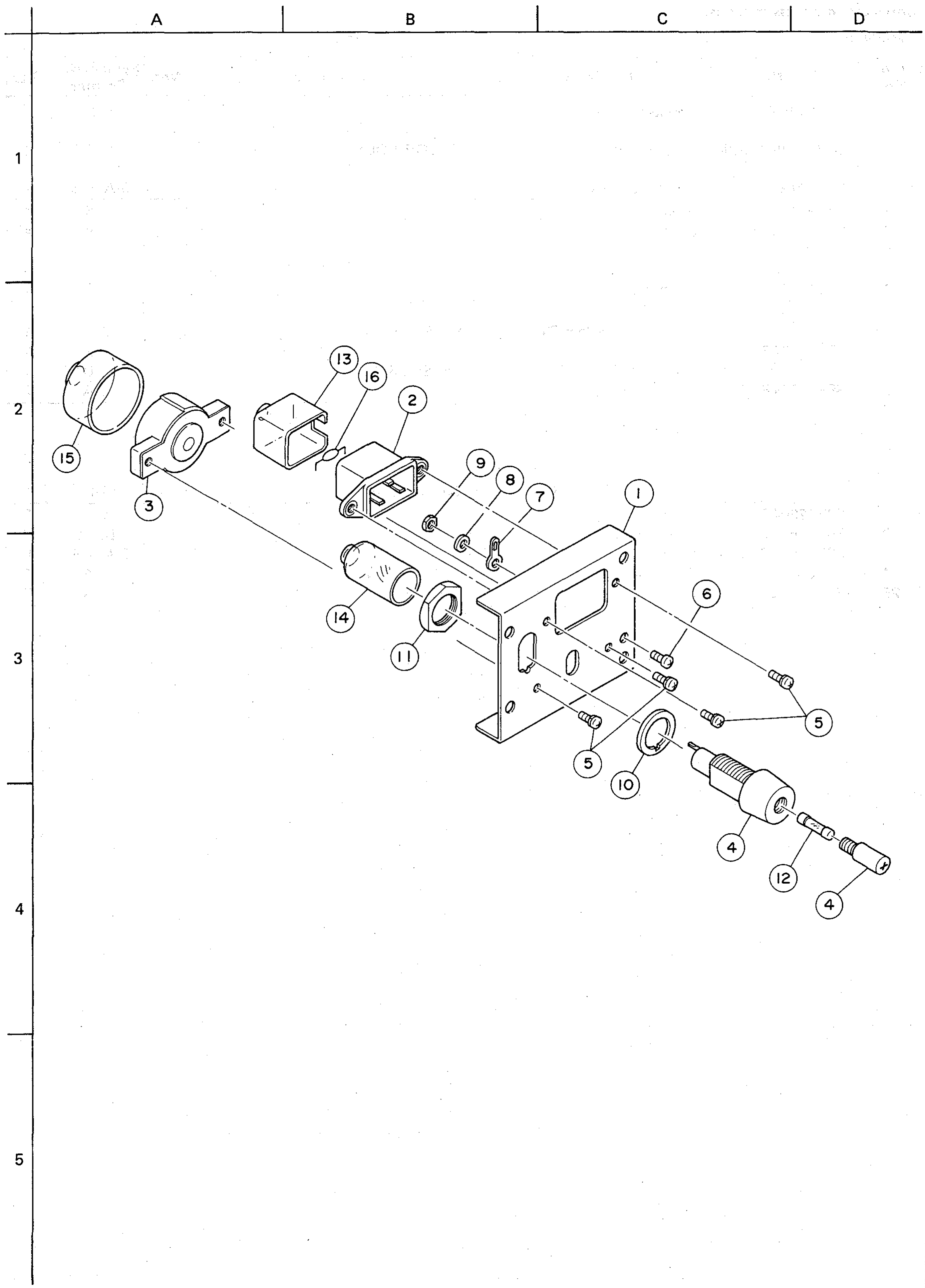


– Connector panel assembly list –

- **CP-5550E**

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
1	PU21439-6-2	Connector Plate			4-B	1
2	–	–			–	–
3	QVF1A2B-123BM	Volume	COLOR LOCK VR		3-A, 3-B	1
4	–	–			–	–
5	PU51213	Connector (BNC Type)			3-A, 4-B	4
6	PU48611	Ring			4-B	4
7	Q03093-439	Spacer			3-A	4
8	–	–			–	–
9	–	–			–	–
10	PU51214	Connector (8 Pin)			2-A	1
11	–	–			–	–
12	–	Audio Level Select P.C.B. Ass'y	See Sec. 8.34		3-D	1
13	SPBP2604R	Screw			2-B	2
14	–	Connector P.C.B. Ass'y	See Sec. 8.46		3-D	1
15	SPBP2604R	Screw			3-A	2
16	–	–			–	–
17	–	–			–	–
18	–	–			–	–
19	–	–			–	–
20	–	Frame Switch P.C.B. Ass'y	See Sec. 8.44		2-D	1
21	SPBP2604R	Screw			2-C	2
22	PU53563-5	XLR Connector			2-B, 2-C	3
23	SPBP2606R	Screw			2-A, 2-B	6
24	PU46471	Aerial Connector			3-A	1
25	SDBP3006M	Screw			2-A	2

7.2.17 AC connector plate



– AC connector plate list –

Symbol No.	Part No.	Part Name	Description	Note	Symbol No. Position	Q'ty
⚠ 1	PU50125	AC Connector Plate			2-C	1
⚠ 2	QMC0335-003	AC Connector			2-B	1
⚠ 3	QSR0085-002	Voltage Selector			2-A	1
⚠ 4	QMG0301-003	Fuse Holder			4-C, 4-D	2
⚠ 5	SDBP3006R	Screw			3-C, 3-D	2
⚠ 6	SDBP4008R	"			3-C	1
⚠ 7	A50221-2	Earth Lug			2-C	1
⚠ 8	WLS4000N	Washer			2-B	1
⚠ 9	NNB4000N	Nut			2-B	1
⚠ 10	–	–			4-C	–
⚠ 11	–	–			3-B	–
⚠ 12	QMF51A2-2R0	Fuse	(F12) (T2.0 A)		4-C	1
⚠ 13	PU54681	Connector Cover			2-B	1
⚠ 14	PU50316	Fuse Cover			3-B	1
⚠ 15	PU54680	Voltage Selector Cover			2-A	1
⚠ 16	QFE52EM-683M	MH Cap			2-B	1

SECTION 8
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS – All resistance values are in ohms (Ω).

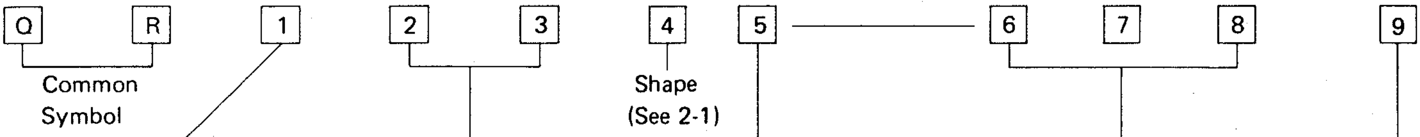
K : 1 000
M : 1 000 000
CR : Carbon Resistor
Comp. R: Composition Resistor
WR : Wire Wound Resistor
OMR : Oxide Metal Film Resistor
VR : Variable Resistor (Potentiometer)
MFR : Metal Film Resistor
FR : Fusible Resistor
PMR : Precision Metal Film Resistor

CAPACITORS – All capacitance values are in μF, unless otherwise indicated.

P : μμF
C Cap : Ceramic Capacitor
E Cap : Electrolytic Capacitor
FM Cap : Film Mica Capacitor
MM Cap : Metalized Mylar Capacitor
MP Cap : Metalized Paper Capacitor
MY Cap : Mylar Capacitor
NP Cap : Non-polar Capacitor
PC Cap : Polycarbonate Capacitor
PP Cap : Poly Pro Capacitor
PS Cap : Polystyrol Capacitor
T Cap : Tantalum Capacitor
TR Cap : Trimmer Capacitor
LL Cap : Low Leak Current Electrolytic Capacitor
TF Cap : Thin Film Capacitor

STANDARD PART NUMBER CODING

1. Fixed Resistor Coding



Type of resistor

C	Composition Resistor
D	Carbon Resistor
F	Unflammable Resistor
G	Oxide Metal Film Resistor
M	Metal Plate Resistor
X	Metal Film Resistor
W	Wire Wound Resistor
Y	Wire Wound Resistor
V	Metal Film Resistor, High Stability
Z	Special Resistor

Rated Wattage

Symbol	Rated wattage
16	1/6 (W)
18	1/8 "
14	1/4 "
12	1/2 "
01	1 "
02	2 "
03	3 "
04	4 "
05	5 "
06	6 "
07	7 "
75	7.5 "
08	8 "
10	10 "
15	15 "
20	20 "
30	30 "

Tolerance

Symbol	Tolerance
F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

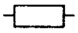
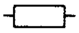
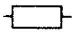
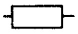
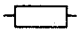
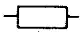
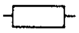
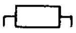
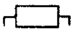
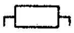
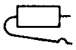
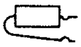
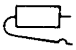
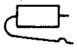
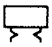
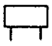
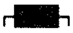
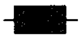
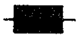
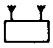
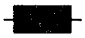
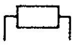
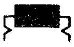
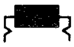
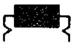
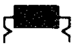
Values

—Example —		
R47		0.47 Ω
4R7		4.7 Ω
470	47 x 10^0	47 Ω
471	47 x 10^1	470Ω
472	47 x 10^2	4.7 KΩ
473	47 x 10^3	47 KΩ
474	47 x 10^4	470 KΩ
475	47 x 10^5	4.7 MΩ
10R2		10.2 Ω
1430	143 x 10^0	143 Ω
1581	158 x 10^1	1.58 KΩ

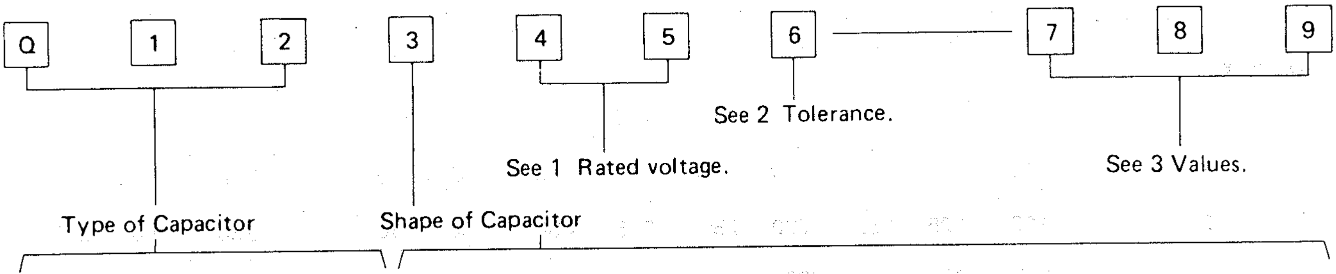
Size

Symbol	Size
A	Small Size
S	Small Size

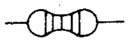
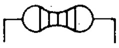
2-1 Shape of resistor (■ : Flame retardant resistor)

Sort	C	D	G	F	M	W	X	Y	V
1									
2									
3									
4									
5						L type			
6						Resin Covered			
7						Enameled			
8									
9									

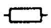
2. Fixed Capacitor Coding


Q
1
2
3
4
5
6
7
8
9
See 2 Tolerance.
See 1 Rated voltage.
See 3 Values.
Type of Capacitor
Shape of Capacitor

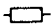
Ceramic Capacitors

Symbol	Type of Capacitor	Disk Lead	Kink Lead			
QCC	Ceramic			4	5	
QCF	"	1	3			
QCS	"	1	3			
QCX	"			1	3	
QCY	"	1,4	3			
QCT	Temperature compensation					
QCZ	Special					

Electrolytic Capacitors

Symbol	Type of Capacitor	Tubular 	Mono-direction	Anti-stress	Forming	Snap-in
QEA	Characteristic A	2	4			
QEB	Low leakage		4	5	6	
QED	Characteristic D	2	4			
QEE	Tantalum		4	5		
QEE	" (small type)		8			
QEL	Characteristic L					7
QEN	Non-polar	2	4	5	6	
QEW	Characterisitc W	2	4	5	6	7
QET	Characteristic W (small type)	2	4	5	6	
QEK	Characteristic W (subminiature type)		4	5		
QEZ	Special					

Paper Film Capacitors

Symbol	Type of Capacitor	Tubular 	Normal		Flame retardant	
			Mono-direction	Kink Lead	Mono-direction	Kink Lead
QFF	Film mica		4			
QFH	Metalized mylar	2	4	3	5	6
QFM	Mylar	2	4	3, 7	5	6
QFN	" (small type)		4			
QFP	Polypropylene		4	3		
QFS	Polystyrole	2	4	3		
QFZ	Special					

1) Rated voltage (V)

First letter \ 2nd letter	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15			6.3				
1	10		16	20	25		40	50	63		35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

2) Tolerance

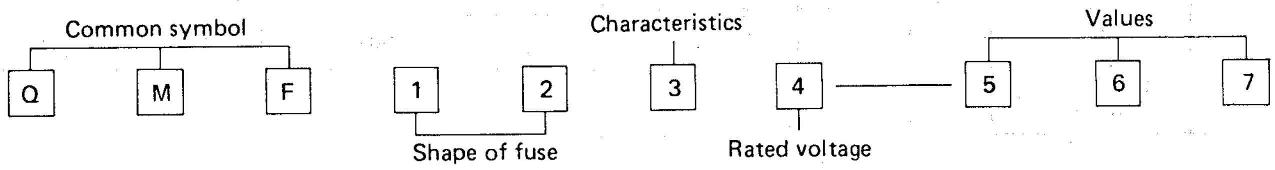
Symbol	F	G	J	K	M	Z	P	A	H	R
(%)	± 1	± 2	± 5	± 10	± 20	+ 80 − 20	+ 100 − 0	+ 100 − 10	+ 50 − 10	+ 30 − 10

3) Values

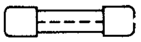
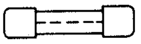
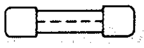
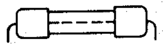
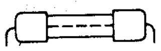
— Example — Values are in picofarads.

101 ..... 10×10^1 ..... 100 pF
102 ..... 10×10^2 ..... 1,000 pF
103 ..... 10×10^3 ..... 10,000 pF = 0.01 μF
104 ..... 10×10^4 ..... 100,000 pF = 0.1 μF
5R0 ..... 5.0 ..... 5 pF

3. Fuse Coding



Shape of Fuse (first and second digit)

Symbol No.	Shape	Remarks
51		ϕ 5.2 x 20
60		ϕ 6.4 x 30
61		ϕ 6.35 x 31.8
63		With 60 Lead Wire
66		With 61 Lead Wire

Rated Voltage (fourth digit)

Symbol No.	Rated Voltage
1	AC 125 V
2	AC 250 V

Value (fifth – seventh digit)

– Example –

R10	0.1 A
R125	0.125 A
1R0	1.0 A
1R2	1.2 A
1R25	1.25 A
100	10 A

Characteristics (third digit)

Symbol No.	Fusing Current	Fusing Time	Remarks
S	160%	Within 1 hr.	Anti-rush Type
	200%	″ 2 min.	
	700% – 2000%	″ 0.01 sec.	
R	160%	″ 1 hr.	Regular Fusible Type
	200%	″ 2 min.	
M	135%	″ 1 hr.	Regular Fusible Type (for UL)
	200%	″ 2 min.	
U	135%	″ 1 hr.	Anti-rush Type (for UL)
	200%	″ 2 min.	
	800% – 2000%	″ 0.01 sec.	
A	210%	″ 2 min.	Anti-rush Type (for Europe)
	275%	0.5 – 10 sec.	
	400%	0.15 – 2 sec.	
	1000%	0.02 – 0.3 sec.	
B	210%	Within 30 min.	Regular Fusible Type (for SEMKO, Europe)
	275%	0.05 – 2 sec.	
	400%	0.01 – 0.3 sec.	

8.1 WARNING/SERVO LOCK LED BOARD ASS'Y 02

Symbol No.	Part No.	Part Name	Note	Description
	PU53340	Printed Board		
	LN217RP	LED		
	LN317GP(V)	"		

8.2 B/W H.PHASE LED BOARD ASS'Y 03

Symbol No.	Part No.	Part Name	Note	Description
	PU53341	Printed Board		
	LN217RP	LED		B/W
	LN317GP(V)	"		H.PHASE

8.3 DRUM TERMINAL BOARD ASS'Y 04

Symbol No.	Part No.	Part Name	Note	Description
	PU48256	Printed Board		

8.4 VIDEO HEAD TERMINAL BOARD ASS'Y 05

Symbol No.	Part No.	Part Name	Note	Description
	PU48254	Printed Board	□	
	PU42461	"	◎ ☆	
	QMF41HK-102	MY Cap	□	

8.5 DRUM ERASE TERMINAL BOARD ASS'Y 06 .... PUS25887-E

Symbol No.	Part No.	Part Name	Note	Description
	PUS25887-E	Printed Board Ass'y	□	

8.6 ERASE HEAD TERMINAL BOARD ASS'Y 07

Symbol No.	Part No.	Part Name	Note	Description
	PU48254-2	Printed Board	□	

8.7 PHOTO TRANSISTOR (START SENSOR) BOARD ASS'Y 08 .... PU48261D

Symbol No.	Part No.	Part Name	Note	Description
	PU49648-2	Printed Board		
	PN202S	Photo Transistor		
	PU53914	Photo Transistor Holder		

8.8 PHOTO TRANSISTOR (END SENSOR) BOARD ASS'Y 09 .... PU48261A

Symbol No.	Part No.	Part Name	Note	Description
	PU48252	Printed Board		
	PN202S	Photo Transistor		
	PU48417-002	Photo Transistor Holder		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.9 MODULATOR CIRCUIT BOARD ASS'Y $\boxed{1}\boxed{0}$

CR-8250E, CR-6650E PU21449C
CP-5550E PU21449D

Symbol No.	Part No.	Part Name	Note	Description
IC 1	LA7016	Integrated Circuit	□ ⊙	
IC 2	"	"	□ ⊙	
IC 3	AN305	"	□ ⊙	
IC 4	LA7016	"	□ ⊙	
IC 5	AN6300	"	□ ⊙	
IC 6	UPC741C	"	□ ⊙	
IC 7	LA7016	"	□ ⊙	
IC 8	–	–		
IC 9	LA7016	Integrated Circuit	□ ⊙	
Q 1	2SC460C	Transistor		
Q 2	2SC2647C	"	□ ⊙	
Q 3	"	"	□ ⊙	
Q 4	"	"	□ ⊙	
Q 5	"	"	□ ⊙	
Q 6	"	"	□ ⊙	
Q 7	–	–		
Q 8	–	–		
Q 9	2SC2647C	Transistor	□ ⊙	
Q10	"	"	□ ⊙	
Q11	"	"	□ ⊙	
Q12	2SD638R	"	□ ⊙	
Q13	2SC2647C	"	□ ⊙	
Q14	"	"	□ ⊙	
Q15	2SD638R	"	□ ⊙	
Q16	2SC2647C	"	□ ⊙	
Q17	"	"	□ ⊙	
Q18	"	"	□ ⊙	
Q19	"	"	□ ⊙	
Q20	"	"	□ ⊙	
Q21	2SK30A-OY	F.E.T.	□ ⊙	
Q22	2SC2647C	Transistor	□ ⊙	
Q23	"	"	□ ⊙	
Q24	2SB641Q	"	□ ⊙	
Q25	2SC2647C	"	□ ⊙	
Q26	"	"	□ ⊙	
Q27	"	"	□ ⊙	
Q28	"	"	□ ⊙	
Q29	"	"	□ ⊙	
Q30	"	"	□ ⊙	
Q31	–	–		
Q32	–	–		
Q33	2SC2647C	Transistor	□ ⊙	
D 1	1SS133	Diode	□ ⊙	
D 2	"	"	□ ⊙	
D 3	"	"	□ ⊙	
D 4	"	"	□ ⊙	
D 5	"	"	□ ⊙	
D 6	"	"	□ ⊙	
D 7	RD3.9EB1	Zener Diode	□ ⊙	
D 8	1SS133	Diode	□ ⊙	
D 9	–	–		
D10	1SS133	Diode	□ ⊙	
D11	"	"	□ ⊙	
D12	"	"	□ ⊙	
D13	"	"	□ ⊙	
D14	MA26WO	"	□ ⊙	
D15	1SS133	"	□ ⊙	
D16	"	"	□ ⊙	
D17	"	"	□ ⊙	
D18	"	"	□ ⊙	
D19	1SS93	"	□ ⊙	
D20	1SS93	Diode	□ ⊙	
D21	MA26WO	"	□ ⊙	
D22	–	–		
D23	–	–		
D24	–	–		
R 1	QRD167J-222	CR		
R 2	" -102	"		
R 3	" -222	"		
R 4	" -682	"	□ ⊙	
R 5	" -222	"		
R 6	" -103	"		
R 7	" -273	"		
R 8	" -103	"	□ ⊙	
R 9	" -563	"	□ ⊙	
R10	" -103	"	□ ⊙	
R11	" -103	"	□ ⊙	
R12	" -103	"	□ ⊙	
R13	" -821	"	□ ⊙	
R14	" -181	"	□ ⊙	
R15	" -822	"	□ ⊙	
R16	" -181	"	□ ⊙	
R17	" -272	"	□ ⊙	
R18	" -181	"	□ ⊙	
R19	" -102	"	□ ⊙	
R20	" -563	"	□ ⊙	
R21	" -103	"	□ ⊙	
R22	" -392	"	□ ⊙	
R23	" -101	"	□ ⊙	
R24	" -332	"	□ ⊙	
R25	" -474	"	□ ⊙	
R26	" -102	"	□ ⊙	
R27	" -102	"	□ ⊙	
R28	" -102	"	□ ⊙	
R29	" -102	"	□ ⊙	
R30	" -273	"	□ ⊙	
R31	" -272	"	□ ⊙	
R32	" -103	"	□ ⊙	
R33	" -102	"	□ ⊙	
R34	" -330	"	□ ⊙	
R35	" -102	"	□ ⊙	
R36	" -183	"	□ ⊙	
R37	" -181	"	□ ⊙	
R38	QRD143K-335	"	□ ⊙	
R39	QRD167J-103	"	□ ⊙	
R40	" -103	"	□ ⊙	
R41	" -472	"	□ ⊙	
R42	QVP4A0B-473	VR	□ ⊙	KILLER SET
R43	QRD167J-223	CR	□ ⊙	
R44	" -223	"	□ ⊙	
R45	" -103	"	□ ⊙	
R46	" -333	"	□ ⊙	
R47	" -103	"	□ ⊙	
R48	" -223	"	□ ⊙	
R49	" -104	"	□ ⊙	
R50	" -222	"	□ ⊙	
R51	" -473	"	□ ⊙	
R52	" -273	"	□ ⊙	
R53	" -222	"	□ ⊙	
R54	" -332	"	□ ⊙	
R55	" -123	"	□ ⊙	
R56	" -750	"	□ ⊙	
R57	" -821	"	□ ⊙	
R58	" -821	"	□ ⊙	

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R59	—	—		
R60	—	—		
R61	—	—		
R62	QRD167J-332	CR	□ ◎	
R63	″ -271	″	□ ◎	
R64	″ -562	″	□ ◎	
R65	″ -101	″	□ ◎	
R66	″ -472	″	□ ◎	
R67	″ -222	″	□ ◎	
R68	″ -102	″	□ ◎	
R69	″ -101	″	□ ◎	
R70	QVP4A0B-104	VR	□ ◎	AGC LEV.
R71	QRD167J-103	CR	□ ◎	
R72	″ -564	″	□ ◎	
R73	″ -391	″	□ ◎	
R74	QRV143F-4320	PMR	□ ◎	
R75	QRD167J-392	CR	□ ◎	
R76	QRV4A0B-472	VR	□ ◎	B/W DEV.
R77	QRD167J-391	CR	□ ◎	
R78	″ -680		□ ◎	
R79	″ -102		□ ◎	
R80	″ -680		□ ◎	
R81	″ -391		□ ◎	
R82	″ -100	″	□ ◎	
R83	QVP4A0B-222	VR	□ ◎	COL. DEV.
R84	—	—		
R85	QRD167J-182	CR		
R86	″ -103	″	□ ◎	
R87	—	—		
R88	QRD167J-822	CR	□ ◎	
R89	″ -222	″	□ ◎	
R90	″ -681	″	□ ◎	
R91	″ -272	″	□ ◎	
R92	″ -392	″	□ ◎	
R93	″ -333	″	□ ◎	
R94	″ -223	″	□ ◎	
R95	″ -103	″	□ ◎	
R96	″ -153	″	□ ◎	
R97	″ -153	″	□ ◎	
R98	QVP4A0B-473	VR	□ ◎	SYMMETRY
R99	QRG019J-121S	OMR	□ ◎	
R100	QRD167J-102	CR	□ ◎	
R101	QVZ3506-222	VR	□ ◎	
R102	—	—		
R103	QRD167J-392	CR	□ ◎	
R104	″ -272	″	□ ◎	
R105	″ -332	″	□ ◎	
R106	″ -222	″	□ ◎	
R107	QVP4A0B-102	VR	□ ◎	DARK CLIP
R108	QRD167J-562	CR	□ ◎	
R109	″ -332	″	□ ◎	
R110	″ -222	″	□ ◎	
R111	QVP4A0B-102	VR	□ ◎	WHITE CLIP
R112	QRD167J-272	CR	□ ◎	
R113	″ -272	″	□ ◎	
R114	″ -102	″	□ ◎	
R115	″ -102	″	□ ◎	
R116	″ -222	″	□ ◎	
R117	″ -103	″	□ ◎	
R118	″ -222	″	□ ◎	
R119	″ -101	″	□ ◎	
R120	″ -100	″	□ ◎	
R121	—	—		
R122	—	—		
R123	QRD167J-820	CR	□ ◎	

Symbol No.	Part No.	Part Name	Note	Description
R124	QRD167J-103	CR	□ ◎	
R125	—	—		
R126	—	—		
R127	—	—		
R128	QRD167J-221	CR	□ ◎	
R129	″ -221	″	□ ◎	
R130	—	—		
R131	—	—		
R132	QRD167J-821	CR	□ ◎	
R133	″ -821	″	□ ◎	
C 1	QCF11EZ-223	C Cap		
C 2	QET41CM-476	E Cap		
C 3	QCS11HJ-121	C Cap		
C 4	″ -121	″		
C 5	″ -120	″		
C 6	QAT3001-015	T Cap		FREQ. ADJ.
C 7	QFN41HJ-333	MY Cap	□ ◎	
C 8	″ -333	″	□ ◎	
C 9	QCS11HJ-220	C Cap	□ ◎	
C10	QFN41HJ-103	MY Cap	□ ◎	
C11	QET41CM-476	E Cap	□ ◎	
C12	—	—		
C13	QCS11HJ-331	C Cap	□ ◎	
C14	QCF11EZ-103	″	□ ◎	
C15	QFN41HJ-333	MY Cap	□ ◎	
C16	″ -103	″	□ ◎	
C17	QCS11HJ-220	C Cap	□ ◎	
C18	QCF11EZ-103	″	□ ◎	
C19	″ -223	″	□ ◎	
C20	QET41CM-106	E Cap	□ ◎	
C21	QFN41HJ-103	MY Cap	□ ◎	
C22	″ -333	″	□ ◎	
C23	″ -333	″	□ ◎	
C24	QCF11EZ-223	C Cap	□ ◎	
C25	QFN41HJ-103	MY Cap	□ ◎	
C26	″ -103	″	□ ◎	
C27	QET41CM-106	E Cap	□ ◎	
C28	QCF11EZ-223	C Cap	□ ◎	
C29	QFN41HJ-103	MY Cap	□ ◎	
C30	QCF11EZ-103	C Cap	□ ◎	
C31	″ -223	″	□ ◎	
C32	QET41CM-476	E Cap	□ ◎	
C33	QCS11HJ-151	C Cap	□ ◎	
C34	″ -150	″	□ ◎	
C35	QFN41HJ-103	MY Cap	□ ◎	
C36	″ -332	″	□ ◎	
C37	QCF11EZ-223	C Cap	□ ◎	
C38	QET41CM-476	E Cap	□ ◎	
C39	″ -106	″	□ ◎	
C40	QCF11EZ-223	C Cap	□ ◎	
C41	QET41HM-105	E Cap	□ ◎	
C42	QCS11HJ-101	C Cap	□ ◎	
C43	QCF11EZ-223	″	□ ◎	
C44	QET41CM-476	E Cap	□ ◎	
C45	QCS11HJ-560	C Cap	□ ◎	
C46	″ -681	″	□ ◎	
C47	″ -271	″	□ ◎	
C48	QET41AM-107	E Cap	□ ◎	
C49	″ -107	″	□ ◎	
C50	QCF11EZ-223	C Cap	□ ◎	
C51	QET41CM-107	E Cap	□ ◎	
C52	QFN41HJ-683	MY Cap	□ ◎	
C53	QCS11HJ-101	C Cap	□ ◎	
C54	QET41AM-107	E Cap	□ ◎	

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C55	QET41AM-107	E Cap	□ ◎	
C56	QCF11EZ-223	C Cap	□ ◎	
C57	QET41CM-107	E Cap	□ ◎	
C58	QEN41AM-337M	NP Cap	□ ◎	
C59	QCS11HJ-220	C Cap	□ ◎	
C60	QET41HM-335	E Cap	□ ◎	
C61	QET41CM-107	″	□ ◎	
C62	QET41AM-107	″	□ ◎	
C63	″ -107	″	□ ◎	
C64	QCF11EZ-223	C Cap	□ ◎	
C65	QET41CM-107	E Cap	□ ◎	
C66	QCF11EZ-223	C Cap	□ ◎	
C67	″ -223	″	□ ◎	
C68	QET41AM-476	E Cap	□ ◎	
C69	QET41AM-107	″	□ ◎	
C70	—	—		
C71	QCF11EZ-103	C Cap	□ ◎	
C72	QET41CM-107	E Cap	□ ◎	
C73	QET41AM-107	″	□ ◎	
C74	—	—		
C75	QFN41HJ-104	MY Cap	□ ◎	
C76	QCS11HJ-100	C Cap	□ ◎	
C77	″ -221	″	□ ◎	
C78	″ -101	″	□ ◎	
C79	QCF11EZ-223	″	□ ◎	
C80	QAT3001-017	T Cap (40P)	□ ◎	CARR. SET
C81	QCS11HJ-680	C Cap	□ ◎	
C82	QFN41HJ-473	MY Cap	□ ◎	
C83	QET41CM-476	E Cap	□ ◎	
C84	QCF11EZ-223	C Cap	□ ◎	
C85	″ -102	″	□ ◎	
C86	″ -223	″	□ ◎	
C87	″ -102	″	□ ◎	
C88	″ -223	″	□ ◎	
C89	QFN41HJ-103	MY Cap	□ ◎	
C90	″ -103	″	□ ◎	
C91	″ -103	″	□ ◎	
C92	QCF11EZ-223	C Cap	□ ◎	
C93	QET41CM-476	E Cap	□ ◎	
C94	—	—		
C95	QCF11EZ-223	C Cap	□ ◎	
C96	QCS11HJ-121	″	□ ◎	
C97	QET41CM-106	E Cap	□ ◎	
C98	QCS11HJ-220	C Cap	□ ◎	
C99	—	—		
C100	QCS11HJ-220	C Cap	□ ◎	
C101	″ -220	″	□ ◎	
C102	″ -220	″	□ ◎	
C103	″ -680	″	□ ◎	
C104	QCF11EZ-103	″		
C105	″ -103	″	□ ◎	
C106	″ -103	″	□ ◎	
C107	″ -103	″	□ ◎	
C108	″ -103	″	□ ◎	
C109	QEK41CM-106	E Cap	□ ◎	
L 1	PU48530-221K	Peaking Coil	□ ◎	
L 2	PU30771-11	Coil	□ ◎	
L 3	PU48530-221K	Peaking Coil	□ ◎	
L 4	″ -221K	″	□ ◎	
L 5	PU30771-7	Coil	□ ◎	
L 6	″ -3	″	□ ◎	
L 7	PU48530-221K	Peaking Coil	□ ◎	
L 8	″ -221K	″	□ ◎	

Symbol No.	Part No.	Part Name	Note	Description
L 9	PU48530-221K	Peaking Coil	□ ◎	
L10	″ -120K	″	□ ◎	
L11	″ -221K	″	□ ◎	
L12	″ -221K	″	□ ◎	
L13	″ -221K	″	□ ◎	
L14	″ -221K	″	□ ◎	
L15	″ -221K	″	□ ◎	
L16	″ -470K	″	□ ◎	
LC1	PU30770-5	LC Block	□ ◎	
LPF 1	PU54064	L.P.F.	□ ◎	
LPF 2	PU54128-2	″	□ ◎	
LPF 3	PU48517-2	″	□ ◎	
BPF 1	PU48516-2	B.P.F.	□ ◎	
CT 1	PU46042-6	Ceramic Trap	□ ◎	
CT 2	″ -6	″	□ ◎	
DL 1	PU54129	Delay Line	□ ◎	
DL 2	PU48515-6	″	□ ◎	
X 1	PU31449-3	Crystal		
P101	PU43351-2Y	Cap. Housing		
P102	″ -4	″	□ ◎	
P103	″ -2	″	□ ◎	
P104	″ -2R	″	□ ◎	
P105	″ -2Y	″	□ ◎	
P106	″ -2Y	″	□ ◎	
P107	″ -2R	″		
P108	—	—		
P109	—	—		
P110	PU43351-2	Cap. Housing		
P111	″ -2	″	□ ◎	
P112	″ -3	″	□ ◎	
P113	″ -2	″	□ ◎	
TP	PU46443	Test Pin	□ ◎	TP1—16
TP	″	″	☆	TP1

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.10 HEAD AMP CIRCUIT BOARD ASS'Y $\boxed{1}\boxed{2}$
CR-8250E, CR-6650E PU21465C
CP-5550E PU21465D

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN607P	Integrated Circuit	□ ◎	
IC 2	TC4069UBP	"		
IC 3	TC4011UBP	"		
IC 4	LA7016	"	□ ◎	
IC 5	"	"	□ ◎	
IC 6	"	"	□ ◎	
IC 7	6A753	"		
IC 8	LA7016	"	□ ◎	
IC 9	AN607P	"		
Q 1	2SC2647C	Transistor	□ ◎	
Q 2	"	"	□ ◎	
Q 3	"	"	□ ◎	
Q 4	"	"	□ ◎	
Q 5	"	"	□ ◎	
Q 6	"	"	□ ◎	
Q 7	"	"	□ ◎	
Q 8	"	"	□ ◎	
Q 9	"	"	□ ◎	
Q10	"	"	□ ◎	
Q11	–	–		
Q12	2SC2647C	Transistor	□ ◎	
Q13	"	"	□ ◎	
Q14	"	"	□ ◎	
Q15	2SB641Q	"	□ ◎	
Q16	2SB643R	"	□ ◎	
Q17	2SD638R	"	□ ◎	
Q18	"	"	□ ◎	
Q19	2SB643R	"	□ ◎	
Q20	2SC2647C	"	□ ◎	
Q21	2SB643R	"	□ ◎	
Q22	2SC941Y	"		
Q23	"	"		
Q24	"	"		
Q25	"	"		
Q26	2SC941Y	"		
Q27	"	"		
Q28	2SC2647C	"		
Q29	"	"		
Q30	"	"		
Q31	"	"	□ ◎	
Q32	"	"		
Q33	"	"		
Q34	"	"		
Q35	"	"		
D 1	MA150LF	Diode	□ ◎	
D 2	"	"	□ ◎	
D 3	1SS133	"	□ ◎	
D 4	RD6.8EB	Zener Diode	□ ◎	
D 5	1SS133	Diode		
D 6	"	"		
D 7	"	"		
D 8	"	"		
D 9	OA91	"		
D10	"	"		
D11	1SS133	"	□ ◎	
R 1	QVP4A0B-222	VR	□ ◎	DUB. REC. LEV.
R 2	QRD167J-333	CR	□ ◎	
R 3	" -562	"	□ ◎	
R 4	" -102	"	□ ◎	

Symbol No.	Part No.	Part Name	Note	Description
R 5	QRD167J-333	CR	□ ◎	
R 6	" -103	"	□ ◎	
R 7	" -102	"	□ ◎	
R 8	" -103	"	□ ◎	
R 9	" -223	"	□ ◎	
R10	" -122	"	□ ◎	
R11	" -102	"	□ ◎	
R12	" -271	"	□ ◎	
R13	" -182	"	□ ◎	
R14	" -222	"	□ ◎	
R15	" -681	"	□ ◎	
R16	QVP4A0B-222	VR	□ ◎	LEV. BAL.
R17	QRD167J-471	CR	□ ◎	
R18	" -562	"	□ ◎	
R19	" -103	"		
R20	QVP4A0B-683	VR		PULSE WID.
R21	QRD167J-103	CR		
R22	" -103	"		
R23	QVP4A0B-683	VR		PULSE WID.
R24	QRD167J-103	CR		
R25	" -100	"		
R26	QVP4A0B-222	VR	□ ◎	COL.REC.LEV.
R27	" -102	"	□ ◎	FM REC LEV.
R28	QRD167J-222	CR	□ ◎	
R29	" -561	"	□ ◎	
R30	" -271	"	□ ◎	
R31	" -222	"	□ ◎	
R32	" -222	"	□ ◎	
R33	" -222	"	□ ◎	
R34	" -681	"	□ ◎	
R35	" -103	"	□ ◎	
R36	" -181	"	□ ◎	
R37	" -221	"	□ ◎	
R38	" -102	"	□ ◎	
R39	–	–		
R40	–	–		
R41	–	–		
R42	QRD167J-103	CR	□ ◎	
R43	" -103	"	□ ◎	
R44	QVP4A0B-472	VR	□ ◎	REC FREQ.
R45	QRD167J-103	CR	□ ◎	
R46	" -103	"	□ ◎	
R47	" -103	"	□ ◎	
R48	" -103	"	□ ◎	
R49	" -472	"	□ ◎	
R50	" -472	"	□ ◎	
R51	" -821	"	□ ◎	
R52	" -332	"	□ ◎	
R53	" -391	"	□ ◎	
R54	" -103	"	□ ◎	
R55	" -183	"	□ ◎	
R56	" -561	"	□ ◎	
R57	" -220	"	□ ◎	
R58	" -102	"	□ ◎	
R59	" -562	"	□ ◎	
R60	" -562	"	□ ◎	
R61	" -102	"	□ ◎	
⚠ R62	QRZ0054-220	Fusible R	□ ◎	
R63	QRD167J-220	CR	□ ◎	
R64	" -4R7	"	□ ◎	
R65	" -4R7	"	□ ◎	
R66	" -822	"	□ ◎	
R67	" -123	"	□ ◎	
R68	" -100	"		
R69	" -223	"	□ ◎	

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R70	QRD167J-333	CR	□ ◎	
R71	〃 -472	〃	□ ◎	
R72	〃 -103	〃	□ ◎	
R73	QVP4A0B-101	VR	□ ◎	REC.COL. BAL.
R74	QRD167J-121	CR	□ ◎	
R75	〃 -680	〃	□ ◎	
R76	QRD143J-1R0	〃		
R77	〃 -1R0	〃		
R78	〃 -331	〃		
R79	〃 -331	〃		
R80	QVP4A0B-472	VR		Q. ADJ.
R81	〃 -472	〃		〃
R82	QRD143J-103	CR		
R83	〃 -103	〃		
R84	〃 -272	〃		
R85	〃 -272	〃		
R86	QRD167J-102	〃		
R87	〃 -102	〃		
R88	QRD143J-331	〃		
R89	〃 -331	〃		
R90	〃 -120	〃		
R91	〃 -120	〃		
R92	〃 -331	〃		
R93	〃 -331	〃		
R94	〃 -101	〃		
R95	〃 -101	〃		
R96	〃 -821	〃		
R97	〃 -821	〃		
R98	QRD141J-102	〃		
R99	〃 -102	〃		
R100	QVP4A0B-222	VR		COL. BAL.
R101	QRD167J-222	CR		
R102	〃 -222	〃		
R103	〃 -103	〃		
R104	〃 -103	〃		
R105	〃 -223	〃		
R106	〃 -223	〃		
R107	〃 -223	〃		
R108	〃 -333	〃		
R109	〃 -472	〃		
R110	〃 -562	〃	□ ◎	
R111	〃 -472	〃		
R112	〃 -102	〃		
R113	〃 -103	〃	□ ◎	
R114	〃 -102	〃		
R115	〃 -223	〃	□ ◎	
R116	〃 -333	〃	□ ◎	
R117	〃 -182	〃		
R118	〃 -182	〃		
R119	〃 -122	〃		
R120	〃 -821	〃		
R121	〃 -822	〃		
R122	〃 -104	〃		
R123	〃 -103	〃		
R124	〃 -102	〃		
R125	〃 -271	〃		
R126	〃 -472	〃		
R127	〃 -560	〃		
R128	QVP4A0B-103	VR		TR. DC LEV.
R129	QRD167J-103	CR		
R130	〃 -102	〃	□ ◎	
R131	〃 -224	〃		
R132	〃 -472	〃		
R133	〃 -122	〃		

Symbol No.	Part No.	Part Name	Note	Description
R134	QRD167J-122	CR		
R135	〃 -472	〃		
R136	〃 -104	〃		
C 1	QFN41HJ-333	MY Cap	□ ◎	
C 2	QCF11EZ-223	C Cap	□ ◎	
C 3	QCS11HJ-221	〃	□ ◎	
C 4	QET41CM-106	E Cap	□ ◎	
C 5	QCF11EZ-223	C Cap	□ ◎	
C 6	〃 -223	〃	□ ◎	
C 7	QET41CM-476	E Cap	□ ◎	
C 8	QFN41HJ-333	MY Cap	□ ◎	
C 9	〃 -333	〃	□ ◎	
C10	〃 -333	〃		
C11	〃 -393	〃		
C12	QCF11EZ-223	C Cap		
C13	QET41CM-476	E Cap		
C14	QFN41HJ-473	MY Cap	□ ◎	
C15	QCF11EZ-223	C Cap	□ ◎	
C16	QET41AM-476	E Cap	□ ◎	
C17	QCF11EZ-223	C Cap	□ ◎	
C18	QFN41HJ-333	〃	□ ◎	
C19	〃 -333	〃	□ ◎	
C20	〃 -333	〃	□ ◎	
C21	QCS11HJ-181	〃	□ ◎	
C22	—	—		
C23	—	—		
C24	QCF11EZ-223	C Cap	□ ◎	
C25	QET41CM-476	E Cap	□ ◎	
C26	QFN41HJ-223	MY Cap	□ ◎	
C27	QCF11EZ-223	C Cap	□ ◎	
C28	QET41CM-476	E Cap	□ ◎	
C29	QCF11EZ-223	C Cap	□ ◎	
C30	QFN41HJ-333	MY Cap	□ ◎	
C31	〃 -333	〃	□ ◎	
C32	QCS11HJ-330	C Cap	□ ◎	
C33	QFN41HJ-333	MY Cap	□ ◎	
C34	QCF11EZ-473	C Cap	□ ◎	
C35	QFN41HJ-333	MY Cap	□ ◎	
C36	〃 -333	〃	□ ◎	
C37	QCF11EZ-473	C Cap	□ ◎	
C38	QET41EM-107	E Cap	□ ◎	
C39	QCF11EZ-223	C Cap	□ ◎	
C40	QET41EM-476	E Cap	□ ◎	
C41	—	—		
C42	QCS11HJ-180	C Cap	□ ◎	
C43	QFN41HJ-104	MY Cap	□ ◎	
C44	QET41CM-107	E Cap	□ ◎	
C45	—	—		
C46	—	—		
C47	QAT3001-006	TR Cap		
C48	〃 -006	〃		
C49	QFN41HJ-273	MY Cap		
C50	〃 -273	〃		
C51	QET41CM-476	E Cap		
C52	〃 -476	〃		
C53	QCF11EZ-223	C Cap		
C54	〃 -223	〃		
C55	〃 -473	〃		
C56	〃 -473	〃		
C57	QFN41HJ-333	MY Cap		
C58	〃 -333	〃		
C59	QET41CM-476	E Cap		
C60	QCF11EZ-223	C Cap		
C61	QFN41HJ-333	MY Cap		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C62	QCF11EZ-103	C Cap		
C63	" -103	"		
C64	QFN41HJ-333	MY Cap	□ ⊙	
C65	QCF11EZ-473	C Cap		
C66	QET41CM-476	E Cap		
C67	QFN41HJ-333	MY Cap	□ ⊙	
C68	QCF11EZ-223	C Cap		
C69	QET41CM-476	E Cap		
C70	QFN41HJ-333	MY Cap		
C71	" -182	"	□ ⊙	
C72	" -223	"	□ ⊙	
C73	QCS11HJ-100	C Cap		
C74	QCF11EZ-223	"		
C75	QFN41HJ-333	MY Cap		
C76	QCF11EZ-223	C Cap		
C77	QET41CM-476	E Cap		
C78	QFN41HJ-333	MY Cap		
C79	" -103	"		
C80	QCF11EZ-223	C Cap		
C81	QET41CM-476	E Cap		
C82	QFN41HJ-104	MY Cap		
C83	" -104	"		
C84	" -103	"		
C85	QCF11EZ-473	C Cap		
L 1	PU48530-221K	Peaking Coil	□ ⊙	
L 2	" -221K	"	□ ⊙	
L 3	" -221K	"		
L 4	—	—		
L 5	PU48530-221K	Peaking Coil	□ ⊙	
L 6	" -221K	"	□ ⊙	
L 7	" -8R2K	"	□ ⊙	
L 8	PU30284-1R	"	□ ⊙	
L 9	PU48530-101K	"	□ ⊙	
L10	" -390K	"		
L11	" -390K	"		
L12	" -221K	"		
L13	" -221K	"		
L14	" -221K	"		
L15	PU30771-9	Coil	□ ⊙	
L16	PU48530-221K	Peaking Coil		
L17	" -221K	"		
LPF 1	PU48518-2	L.P.F.		
RY 1	PU54003	Relay	□ ⊙	
P121	PU43351-3R	Cap. Housing		
P122	" -2R	"		
P123	" -3	"		
P124	" -7	"		
P125	" -2	"	□ ⊙	
P126	" -3Y	"		
P127	" -7R	"		
P128	" -3	"		
P129	" -2Y	"		
P130	" -2Y	"		
TP	PU48578	Test Point	□ ⊙	TP2–8
TP	"	"	☆	TP3–8
TP	PU53460	Test Pin		TP1, TP9–11
	PU48575	Shield Case (1)	□ ⊙	

8.11 VIDEO ERASE AMP CIRCUIT BOARD ASS'Y 1 3
CR-8250E PU33593B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	TC4538BP	Integrated Circuit		
Q 1	2SD636Q	Transistor		
Q 2	2SD973R	"		
Q 3	2SC1162WTC	"		
Q 4	"	"		
Q 5	—	—		
Q 6	—	—		
Q 7	—	—		
Q 8	—	—		
D 1	—	—		
D 2	—	—		
R 1	QRD167J-333	CR		
R 2	" -103	"		
R 3	" -102	"		
R 4	" -822	"		
R 5	" -123	"		
R 6	" -123	"		
R 7	" -222	"		
R 8	QRX126J-4R7	MFR		
R 9	—	—		
R10	—	—		
R11	—	—		
R12	—	—		
R13	—	—		
R14	—	—		
R15	—	—		
R16	—	—		
R17	—	—		
R18	—	—		
R19	—	—		
R20	—	—		
R21	—	—		
R22	—	—		
R23	—	—		
R24	—	—		
R25	—	—		
C 1	QET41CM-106	E Cap		
C 2	QCF11EZ-102	C Cap		
C 3	QCS11HJ-331	"		
C 4	" -271	"		
C 5	" -271	"		
C 6	QET41EM-106	E Cap		
C 7	QFN41HK-182	MY Cap		
C 8	QCF11EZ-103	C Cap		
C 9	" -103	"		
C10	—	—		
C11	—	—		
C12	—	—		
C13	—	—		
C14	—	—		
C15	—	—		
C16	—	—		
L 1	PU30284-1R	Choke Coil		
T 1	PU44336	Osc. Trans.		

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
P131	PU43351-3	Cap. Housing		
P132	″ -3Y	″		
P133	–	–		
P134	PU43351-2R	Cap. Housing		
TP	PU53460	Test Pin		TP1–2

8.12 P.B. VIDEO AMP BOARD ASS'Y 1 4

CR-8250E, CR-6650E PU21483C
CP-5550E PU21483D

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN316	Integrated Circuit		
IC 2	SN76670N	″		
IC 3	LA7016	″		
IC 4	VC2011	″		
IC 5	″	″		
IC 6	–	–		
IC 7	SN76670N	Integrated Circuit		
IC 8	AN607P	″		
IC 9	SN76670N	″		
IC10	AN607P	″		
IC11	LA7016	″		
Q 1	2SC2647C	Transistor		
Q 2	″	″		
Q 3	2SK30A-O	F.E.T.		
Q 4	2SC2647C	Transistor		
Q 5	″	″		
Q 6	″	″		
Q 7	″	″		
Q 8	″	″		
Q 9	″	″		
Q10	″	″		
Q11	″	″		
Q12	″	″		
Q13	″	″		
Q14	″	″		
Q15	″	″		
Q16	2SB641Q	″		
Q17	2SC2647C	″		
Q18	″	″		
Q19	″	″		
Q20	2SB641Q	″		
Q21	2SC2647C	″		
Q22	2SC1545B	″		
Q23	2SD638R	″		
Q24	″	″		
Q25	2SC2647C	″		
Q26	″	″		
Q27	″	″		
Q28	″	″		
Q29	″	″		
Q30	″	″		
Q31	″	″		
Q32	″	″		
Q33	″	″		
Q34	″	″	☆	
Q35	″	″	☆	
Q36	″	″	☆	
D 1	OA91	Diode		
D 2	1SS133	″		
D 3	″	″		
D 4	″	″		
D 5	1S1926-M	″		
D 6	″ -M	″		
D 7	1SS133	″		
D 8	″	″		
D 9	″	″		
D10	″	″		
D11	OA91	″		
D12	1SS133	″		
D13	″	″		
D14	RD3.9EB	Zener Diode		

□ symbol: CR-8250E only ⊛ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
D15	1SS133	Diode	☆	
R 1	QVP4A0B-222	VR		PB FM LEV.
R 2	QRD167J-563	CR		
R 3	" -563	"		
R 4	" -122	"		
R 5	" -821	"		
R 6	QVP4A0B-472	VR		FREQ. ADJ.
R 7	QRD167J-222	CR		
R 8	" -331	"		
R 9	" -102	"		
R10	" -102	"		
R11	" -562	"		
R12	" -152	"		
R13	" -100	"		
R14	" -103	"		
R15	" -391	"		
R16	" -392	"		
R17	" -391	"		
R18	" -183	"		
R19	" -472	"		
R20	" -152	"		
R21	" -821	"		
R22	" -562	"		
R23	" -563	"		
R24	" -333	"		
R25	" -392	"		
R26	" -223	"		
R27	QVP4A0B-223	VR		LIMIT BAL.
R28	QRD167J-154	CR		
R29	" -102	"		
R30	" -391	"		
R31	" -272	"		
R32	" -222	"		
R33	" -102	"		
R34	" -821	"		
R35	" -823	"		
R36	" -102	"		
R37	" -153	"		
R38	QVP4A0B-223	VR		CARR. BAL.
R39	QRD167J-391	CR		
R40	" -681	"		
R41	QVP4A0B-102	VR		B/W LEV.
R42	QRD167J-391	CR		
R43	–	–		
R44	–	–		
R45	–	–		
R46	QRD167J-391	CR		
R47	" -3R9	"		
R48	QVP4A0B-222	VR		COL. LEV.
R49	QRD167J-222	CR		
R50	" -103	"		
R51	" -331	"		
R52	" -562	"		
R53	" -182	"		
R54	" -151	"		
R55	" -333	"		
R56	" -562	"		
R57	" -471	"		
R58	" -332	"		
R59	" -103	"		
R60	" -471	"		
R61	" -561	"		
R62	" -122	"		

Symbol No.	Part No.	Part Name	Note	Description
R63	QRD167J-222	CR		
R64	" -391	"		
R65	" -183	"		
R66	" -331	"		
R67	" -152	"		
R68	" -221	"		
R69	" -681	"		
R70	" -3R3	"		
R71	" -3R3	"		
R72	" -222	"		
R73	" -103	"		
R74	" -391	"		
R75	" -100	"		
R76	QVP4A0B-471	VR		APERTURE
R77	QRD167J-103	CR		
R78	" -103	"		
R79	" -681	"		
R80	" -472	"		
R81	" -152	"		
R82	" -152	"		
R83	" -221	"		
R84	" -222	"		
R85	" -391	"		
R86	QVP4A0B-102	VR		CHROM. LEV.
R87	QRD167J-4R7	CR		
R88	" -4R7	"		
R89	" -103	"		
R90	" -472	"		
R91	" -562	"		
R92	" -102	"		
R93	" -562	"		
R94	" -104	"		
R95	" -103	"		
R96	" -332	"		
R97	QRG129J-680	OMR		
R98	QRD167J-330	CR		
R99	" -123	"		
R100	" -122	"		
R101	" -102	"		
R102	" -750	"		
R103	" -750	"		
R104	" -750	"		
R105	" -153	"		
R106	" -333	"		
R107	" -222	"		
R108	" -222	"		
R109	" -392	"		
R110	–	–		
R111	–	–		
R112	–	–		
R113	QRD167J-153	CR		
R114	QVP4A0B-223	VR		LIMIT BAL.
R115	QRD167J-124	CR		
R116	" -102	"		
R117	" -391	"		
R118	" -682	"		
R119	" -473	"		
R120	" -563	"		
R121	" -102	"		
R122	QVP4A0B-472	VR		DUB. EQ1
R123	QRD167J-102	CR		
R124	QVP4A0B-102	VR		DUB. EQ2
R125	QRD167J-122	CR		
R126	" -391	"		
R127	" -181	"		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R128	QRD167J-332	CR		
R129	" -391	"		
R130	" -822	"		
R131	" -153	"		
R132	QVP4A0B-223	VR		LIMIT BAL.
R133	QRD167J-124	CR		
R134	" -102	"		
R135	" -561	"		
R136	—	—		
R137	QRD167J-272	CR		
R138	" -332	"		
R139	" -102	"		
R140	" -102	"		
R141	" -103	"		
R142	—	—		
R143	QVP4A0B-222	VR		DUB.FM.LEV.
R144	QRD167J-102	CR		
R145	" -681	"		
R146	" -392	"		
R147	QVP4A0B-222	VR		DUB.COL.LEV.
R148	QRD167J-182	CR		
R149	" -391	"		
R150	" -182	"		
R151	" -562	"		
R152	QRG129J-680	OMF R		
R153	QRD167J-330	CR		
R154	" -123	"		
R155	" -122	"		
R156	" -102	"		
R157	" -750	"		
R158	" -103	"	☆	
R159	" -103	"	☆	
R160	" -682	"	☆	
R161	" -562	"	☆	
R162	" -562	"	☆	
C 1	QFN41HJ-223	MY Cap		
C 2	QCS11HJ-470	C Cap		
C 3	QCF11EZ-223	"		
C 4	QET41CM-476	E Cap		
C 5	—	—		
C 6	QET41CM-476	E Cap		
C 7	QCF11EZ-223	C Cap		
C 8	QCS11HJ-561	"		
C 9	QFN41HJ-223	MY Cap		
C10	QCS11HJ-101	C Cap		
C11	QCF11HP-102	"		
C12	QFN41HJ-223	MY Cap		
C13	" -473	"		
C14	QCS11HJ-101	C Cap		
C15	" -101	"		
C16	QFN41HJ-103	MY Cap		
C17	" -103	"		
C18	" -103	"		
C19	QET41HM-105	E Cap		
C20	QFN41HJ-103	MY Cap		
C21	QCF11EZ-223	C Cap		
C22	QET41CM-476	E Cap		
C23	QCF11EZ-223	C Cap		
C24	" -223	"		
C25	QFN41HJ-103	MY Cap		
C26	" -223	"		
C27	QCF11EZ-223	C Cap		
C28	QET41CM-476	E Cap		

Symbol No.	Part No.	Part Name	Note	Description
C29	QFN41HJ-223	MY Cap		
C30	QCF11EZ-473	C Cap		
C31	" -223	"		
C32	QET41CM-476	E Cap		
C33	QCF11EZ-223	C Cap		
C34	QET41CM-106	E Cap		
C35	QCF11EZ-223	C Cap		
C36	" -223	"		
C37	QFN41HJ-223	MY Cap		
C38	QCS11HJ-220	C Cap		
C39	" -181	"		
C40	QET41CM-476	E Cap		
C41	QCF11EZ-473	C Cap		
C42	" -223	"		
C43	QET41AM-476	E Cap		
C44	" -476	"		
C45	QET41CM-107	"		
C46	QCF11EZ-223	C Cap		
C47	QET41AM-476	E Cap		
C48	" -476	"		
C49	QET41CM-476	"		
C50	QCF11EZ-223	C Cap		
C51	—	—		
C52	QCS11HJ-470	C Cap		
C53	" -221	"		
C54	QEV41AR-227	E Cap		
C55	QCS11HJ-121	C Cap		
C56	" -271	"		
C57	QCF11EZ-223	"		
C58	QET41CM-107	E Cap		
C59	QCS11HJ-681	C Cap		
C60	" -101	"		
C61	" -391	"		
C62	QCF11HP-222	"		
C63	QFN41HJ-333	MY Cap		
C64	QCS11HJ-270	C Cap		
C65	—	—		
C66	QET41AM-107	E Cap		
C67	QCF11EZ-223	C Cap		
C68	" -223	"		
C69	" -223	"		
C70	QET41CM-476	E Cap		
C71	QFN41HJ-223	MY Cap		
C72	QCS11HJ-331	C Cap		
C73	QET41HM-105	E Cap		
C74	QEV41AR-227	"		
C75	QET41AM-476	"		
C76	QET41HM-105	"		
C77	QFN41HJ-102	MY Cap		
C78	QEV41AR-227	E Cap		
C79	QCF11EZ-223	C Cap		
C80	" -223	"		
C81	QET41CM-107	E Cap		
C82	" -106	"		
C83	" -106	"		
C84	" -106	"		
C85	" -107	"		
C86	QCF11EZ-473	C Cap		
C87	QCS11HJ-5R0	"		
C88	QET41CM-476	E Cap		
C89	" -476	"		
C90	QCF11EZ-223	C Cap		
C91	QEU41AM-108	E Cap		
C92	" -108	"		
C93	QET41CM-476	"		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C94	QCF11EZ-223	C Cap		
C95	QFN41HJ-223	MY Cap		
C96	QCS11HJ-470	C Cap		
C97	—	—		
C98	—	—		
C99	QFN41HJ-223	MY Cap		
C100	QCF11EZ-223	C Cap		
C101	" -223	"		
C102	" -223	"		
C103	QET41CM-476	E Cap		
C104	QCF11EZ-223	C Cap		
C105	QFN41HJ-223	MY Cap		
C106	QCF11EZ-223	C Cap		
C107	QET41CM-476	E Cap		
C108	QCS11HJ-560	C Cap		
C109	QFN41HJ-223	MY Cap		
C110	" -223	"		
C111	" -223	"		
C112	QCF11EZ-223	C Cap		
C113	" -223	"		
C114	QET41CM-476	E Cap		
C115	QCF11EZ-223	C Cap		
C116	QFN41HJ-223	MY Cap		
C117	QCF11EZ-223	C Cap		
C118	—	—		
C119	QFN41HJ-223	MY Cap		
C120	" -223	"		
C121	QCF11EZ-223	C Cap		
C122	QET41CM-476	E Cap		
C123	QCF11EZ-473	C Cap		
C124	QET41CM-476	E Cap		
C125	QFN41HJ-223	MY Cap		
C126	" -333	"		
C127	QCS11HJ-5R0	C Cap		
C128	QCF11EZ-223	"		
C129	QET41CM-476	E Cap		
C130	QET41HM-105	"		
C131	QFN41HJ-333	MY Cap		
C132	QET41CM-476	E Cap		
C133	QCF11EZ-473	C Cap		
C134	QET41AM-107	E Cap		
C135	QCS11HJ-680	C Cap		
C136	" -121	"		
C137	QCF11EZ-103	"		
C138	" -103	"		
C139	" -103	"		
C140	" -103	"		
C141	" -103	"		
L 1	PU48530-180K	Peaking Coil		
L 2	" -221K	"		
L 3	" -221K	"		
L 4	" -221K	"		
L 5	" -470K	"		
L 6	" -5R6K	"		
L 7	" -8R2K	"		
L 8	" -221K	"		
L 9	" -221K	"		
L10	" -221K	"		
L11	" -221K	"		
L12	" -221K	"		
L13	" -180K	"		
L14	" -221K	"		
L15	" -330K	"		
L16	" -221K	"		
L17	" -221K	"		
L18	" -221K	"		
L19	" -221K	"		
L20	" -100K	"		
L21	PU48530-221K	Peaking Coil		
L22	PU30771-15	Coil		
L23	PU48530-221K	Peaking Coil		
L24	" -221K	"		
L25	" -221K	"		
L26	" -221K	"		
L27	" -470K	"		
LPF 1	PU54063	L.P.F.		
LPF 2	PU54064	"		
LPF 3	PU30773	"		
SW 1	PU54066-2	DIP SW.		
DL 1	PU43627E	Delay Line		
DL 2	PU30773	"		
DL 3	PU54129	"		
DL 4	—	—		
DL 5	PU54065	Delay Line		
P141	PU43351-2	Cap. Housing		
P142	" -2Y	"		
P143	" -5R	"		
P144	" -2R	"		
P145	" -4	"		
P146	" -2Y	"		
P147	" -2	"		
TP	PU53460	Test Pin		TP1—15

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.13 COLOR PROCESS AMP CIRCUIT BOARD ASS'Y 1 6 .... PU21496B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN305	Integrated Circuit		
IC 2	LA7016	"		
IC 3	—	—		
IC 4	—	—		
IC 5	AN306	Integrated Circuit		
IC 6	AN307	"		
IC 7	TC4538BP	"		
IC 8	LA7016	"		
IC 9	"	"		
Q 1	2SC2647C	Transistor		
Q 2	"	"		
Q 3	"	"		
Q 4	"	"		
Q 5	"	"		
Q 6	"	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"		
Q10	—	—		
Q11	2SC2647C	Transistor		
Q12	2SK30A-OY	F.E.T.		
Q13	2SC2647C	Transistor		
Q14	"	"		
Q15	"	"		
Q16	"	"		
Q17	"	"		
Q18	"	"		
Q19	"	"		
Q20	"	"		
Q21	"	"		
Q22	"	"		
Q23	"	"		
Q24	—	—		
Q25	—	—		
D 1	1SS133	Diode		
D 2	"	"		
D 3	—	—		
D 4	—	—		
D 5	1SS133	Diode		
D 6	"	"		
D 7	"	"		
D 8	"	"		
D 9	"	"		
D10	—	—		
D11	—	—		
D12	—	—		
D13	1SS133	Diode		
D14	"	"		
D15	"	"		
R 1	QVZ3506-222	VR		PB COL.LEV.
R 2	QRD167J-562	CR		
R 3	" -223	"		
R 4	" -273	"		
R 5	" -273	"		
R 6	" -104	"		
R 7	QVZ3506-103	VR		CONV. BAL.
R 8	QRD167J-682	CR		
R 9	" -392	"		
R10	" -272	"		
R11	—	—		
R12	—	—		

Symbol No.	Part No.	Part Name	Note	Description
R13	QRD167J-822	CR		
R14	" -152	"		
R15	" -102	"		
R16	" -102	"		
R17	" -223	"		
R18	" -223	"		
R19	" -222	"		
R20	" -102	"		
R21	" -181	"		
R22	" -272	"		
R23	" -181	"		
R24	" -102	"		
R25	" -152	"		
R26	" -122	"		
R27	" -122	"		
R28	" -822	"		
R29	" -331	"		
R30	" -334	"		
R31	" -472	"		
R32	" -333	"		
R33	" -104	"		
R34	" -103	"		
R35	" -103	"		
R36	" -222	"		
R37	" -221	"		
R38	—	—		
R39	—	—		
R40	—	—		
R41	—	—		
R42	—	—		
R43	—	—		
R44	—	—		
R45	—	—		
R46	—	—		
R47	—	—		
R48	—	—		
R49	—	—		
R50	—	—		
R51	QRD167J-822	CR		
R52	" -682	"		
R53	" -820	"		
R54	" -183	"		
R55	" -183	"		
R56	" -820	"		
R57	" -823	"		
R58	" -182	"		
R59	" -182	"		
R60	" -271	"		
R61	" -271	"		
R62	QVZ3506-473	VR		KILLER SET
R63	QRD167J-103	CR		
R64	" -182	"		
R65	" -103	"		
R66	QVZ3506-332	VR		SUB.COL. LOCK
R67	QRD167J-472	CR		
R68	" -471	"		
R69	" -123	"		
R70	" -561	"		
R71	" -562	"		
R72	" -104	"		
R73	QRV143F-3300	PMR		
R74	" -3300	"		
R75	QRD167J-102	CR		
R76	" -122	"		
R77	" -473	"		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R78	QRD167J-562	CR		
R79	" -101	"		
R80	" -392	"		
R81	" -221	"		
R82	" -103	"		
R83	" -103	"		
R84	" -472	"		
R85	" -272	"		
R86	QVZ3506-102	VR		H. LOCK
R87	QRD167J-272	CR		
R88	" -122	"		
R89	" -222	"		
R90	—	—		
R91	—	—		
R92	—	—		
R93	—	—		
R94	QRD167J-152	CR		
R95	" -152	"		
R96	" -223	"		
R97	" -183	"		
R98	" -101	"		
R99	" -222	"		
R100	" -101	"		
R101	" -562	"		
R102	—	—		
R103	QRD167J-102	CR		
R104	" -332	"		
R105	" -153	"		
R106	" -222	"		
R107	" -561	"		
R108	" -102	"		
R109	" -102	"		
R110	" -103	"		
R111	" -102	"		
R112	" -102	"		
R113	" -182	"		
R114	" -561	"		
R115	" -104	"		
R116	" -472	"		
R117	" -103	"		
R118	" -391	"		
R119	—	—		
R120	QRD167J-683	CR		
R121	QVZ3506-473	VR		
R122	QRD167J-683	CR		
R123	—	—		
R124	—	—		
R125	QRD167J-221	CR		
R126	" -221	"		
R127	" -102	"		
R128	" -221	"		
R129	" -680	"		
R130	" -103	"		
R131	" -221	"		
R132	" -682	"		
R133	" -103	"		
R134	" -103	"		
R135	" -221	"		
R136	—	—		
R137	—	—		
R138	QRD167J-104	CR		
R139	" -103	"		
R140	" -563	"		
R141	" -274	"		

Symbol No.	Part No.	Part Name	Note	Description
R142	QRD167J-182	CR		
R143	" -104	"		
R144	" -103	"		
R145	—	—		
R146	—	—		
R147	—	—		
R148	—	—		
R149	—	—		
R150	QRD167J-123	CR		
R151	" -223	"		
R152	" -182	"		
R153	" -683	"		
R154	—	—		
R155	QRD167J-104	CR		
R156	—	—		
R157	QRD167J-123	CR		
R158	" -104	"		
R159	QRD161J-103	"		
R160	" -152	"		
R161	" -152	"		
C 1	QET41CM-106	E Cap		
C 2	QCF11EZ-103	C Cap		
C 3	—	—		
C 4	—	—		
C 5	QET41CM-106	E Cap		
C 6	QFN41HJ-103	MY Cap		
C 7	" -333	"		
C 8	" -103	"		
C 9	—	—		
C10	QFN41HJ-333	MY Cap		
C11	QCF11EZ-103	C Cap		
C12	QCS11HJ-220	"		
C13	QCF11EZ-223	"		
C14	QFN41HJ-223	MY Cap		
C15	" -103	"		
C16	" -223	"		
C17	QCF11EZ-223	C Cap		
C18	QFN41HJ-223	MY Cap		
C19	QCF11EZ-223	C Cap		
C20	QET41CM-476	E Cap		
C21	QCF11EZ-223	C Cap		
C22	" -223	"		
C23	QET41CM-476	E Cap		
C24	QCS11HJ-101	C Cap		
C25	QCF11EZ-223	"		
C26	QFN41HJ-333	MY Cap		
C27	—	—		
C28	QET41CM-105	E Cap		
C29	QCF11EZ-223	C Cap		
C30	QET41CM-476	E Cap		
C31	QFN41HJ-333	MY Cap		
C32	QET41CM-476	E Cap		
C33	QCS11HJ-681	C Cap		
C34	" -681	"		
C35	—	—		
C36	—	—		
C37	—	—		
C38	—	—		
C39	—	—		
C40	—	—		
C41	—	—		
C42	—	—		
C43	—	—		
C44	—	—		
C45	—	—		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C46	—	—		
C47	QCS11HJ-820	C Cap		
C48	" -820	"		
C49	QFN41HJ-103	MY Cap		
C50	" -103	"		
C51	QET41CM-106	E Cap		
C52	QET41EM-475	"		
C53	QCF11EZ-103	C Cap		
C54	QET41EM-475	E Cap		
C55	QFN41HJ-152	MY Cap		
C56	QET41CM-106	E Cap		
C57	QCF11EZ-223	C Cap		
C58	QFN41HJ-152	MY Cap		
C59	QCS11HJ-271	C Cap		
C60	QET41HM-225	E Cap		
C61	—	—		
C62	QFN41HJ-224	MY Cap		
C63	—	—		
C64	PU45582-122	DIP MY Cap		
C65	QCS11HJ-471	C Cap		
C66	QFN41HJ-103	MY Cap		
C67	" -103	"		
C68	—	—		
C69	QFN41HJ-103	MY Cap		
C70	QCF11EZ-223	C Cap		
C71	QET41CM-106	E Cap		
C72	" -106	"		
C73	QCF11EZ-223	C Cap		
C74	—	—		
C75	QET41CM-476	E Cap		
C76	—	—		
C77	—	—		
C78	QCF11EZ-223	C Cap		
C79	QET41CM-476	E Cap		
C80	QCF11EZ-223	C Cap		
C81	QET41CM-476	E Cap		
C82	QET41AM-107	"		
C83	QET41HM-225	"		
C84	" -474	"		
C85	QCF11EZ-223	C Cap		
C86	" -102	"		
C87	PU45583-561	DIP MY Cap		
C88	QFN41HJ-333	MY Cap		
C89	" -332	"		
C90	QCF11EZ-223	C Cap		
C91	" -223	"		
C92	QCS11HJ-391	"		
C93	QAT3001-008	TR Cap		FREQ. ADJ.
C94	QCS11HJ-100	C Cap		
C95	QCF11EZ-102	"		
C96	QCS11HJ-101	"		
C97	" -330	"		
C98	QFN41HJ-103	MY Cap		
C99	" -103	"		
C100	" -103	"		
C101	QCS11HJ-330	C Cap		
C102	QFN41HJ-272	MY Cap		
C103	" -103	"		
C104	QCF11EZ-223	C Cap		
C105	—	—		
C106	QFN41HJ-103	MY Cap		
C107	QET41CR-476	E Cap		
C108	QCF11EZ-223	C Cap		
C109	QFN41HJ-103	MY Cap		
C110	—	—		

Symbol No.	Part No.	Part Name	Note	Description
C111	QFN41HJ-103	MY Cap		
C112	QET41CR-476	E Cap		
C113	QFN41HJ-103	MY Cap		
C114	" -103	"		
C115	QCS11HJ-470	C Cap		
C116	QFN41HJ-103	MY Cap		
C117	QCS11HJ-561	C Cap		
C118	QFN41HJ-103	MY Cap		
C119	QET41CM-476	E Cap		
C120	QFN41HJ-103	MY Cap		
C121	—	—		
C122	QET41HM-105	E Cap		
C123	QFN41HJ-103	MY Cap		
C124	QET41HM-105	E Cap		
C125	QFN41HJ-393	MY Cap		
C126	QCF11EZ-103	C Cap		
C127	QFN41HJ-103	MY Cap		
C128	QET41CM-476	E Cap		
C129	QCF11EZ-103	C Cap		
C130	" -103	"		
C131	QET41CR-476	E Cap		
C132	QCF11EZ-103	C Cap		
C133	—	—		
C134	—	—		
C135	—	—		
C136	QFN41HJ-103	MY Cap		
C137	" -103	"		
C138	" -103	"		
C139	QET41CJ-476	E Cap		
C140	QCF11EZ-223	C Cap		
C141	QET41FR-476	E Cap		
C142	QET41CM-476	"		
C143	—	—		
C144	—	—		
C145	QFN41HJ-333	MY Cap		
C146	QET41CM-476	E Cap		
C147	—	—		
C148	QFN41HJ-392	MY Cap		
C149	" -472	"		
C150	" -103	"		
C151	QCF11EZ-103	C Cap		
L 1	PU48530-221K	Peaking Coil		
L 2	" -221K	"		
L 3	" -471K	"		
L 4	" -221K	"		
L 5	PU30284-28	Coil		
L 6	—	—		
L 7	—	—		
L 8	—	—		
L 9	A04725-560	"		
L10	PU48530-221K	"		
L11	" -221K	"		
L12	" -220K	"		
L13	A04725-1800	"		
L14	PU48530-221K	"		
L15	PU5002	Coil		
L16	PU48530-220K	Peaking Coil		
L17	—	—		
L18	PU48530-221K	Peaking Coil		
LC 1	PU30770-2	LC Block		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
BPF 1	PU30190-6S	B.P.F.		
LPF 1	PU48517-4	L.P.F.		
CT1	PU46042-2	Ceramic Trap		
CT2	" -2	"		
CF1	PU46521-3	Ceramic Filter		
CF2	PU54810	"		
X 1	PU31449-2	Crystal		
P161	PU43351-3Y	Cap. Housing		
P162	" -2	"		
P163	" -2	"		
P164	" -2R	"		
P165	" -5R	"		
P166	" -2Y	"		
P167	" -3	"		
P168	" -2	"		
P169	" -2Y	"		
P170	" -2R	"		
P171	" -2	"		
P172	" -2R	"		
P173	" -2Y	"		
TP	PU46443	Test Pin		TP1–27
TP	"	" Except		TP9, 12, 16, 24, 25

8.14 ACC FIELD MEMORY BOARD ASS'Y 18

.... PU54984B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	TC4011UBP	Integrated Circuit		
Q 1	2SC2647C	Transistor		
Q 2	"	"		
R 1	QRD167J-682	CR		
R 2	" -682	"		
R 3	" -104	"		
R 4	" -104	"		
R 5	" -123	"		
R 6	" -123	"		
R 7	" -104	"		
R 8	" -104	"		
R 9	" -221	"		
C 1	QEK41EM-474	E Cap		
C 2	" -475	"		
C 3	QCF11HP-103	C Cap		
C 4	QEK41CM-476	E Cap		
C 5	QCF11HP-223	C Cap		
P181	PU43351-3	Cap. Housing		
P182	" -3	"		

8.15 COLOR FRAME SERVO BOARD ASS'Y 22

CR-8250E PU21599A

Symbol No.	Part No.	Part Name	Note	Description
IC 1	12VT10	Integrated Circuit		
IC 2	AN608P	"		
IC 3	21VT09	"		
IC 4	LM311P	"		
IC 5	12VT10	"		
IC 6	AN608P	"		
IC 7	21VT09	"		
IC 8	LM311P	"		
IC 9	–	–		
IC10	–	–		
IC11	TL094CN	Integrated Circuit		
IC12	TC4081BP	"		
IC13	TC4013BP	"		
IC14	TC4518BP	"		
IC15	TC4013BP	"		
IC16	TC40103BP	"		
IC17	"	"		
IC18	"	"		
IC19	"	"		
IC20	TC4013BP	"		
IC21	TC4066BP	"		
IC22	TC4069UBP	"		
IC23	TC4071BP	"		
IC24	TC4011BP	"		
IC25	TC4013BP	"		
IC26	TC40103BP	"		
IC27	TC4011BP	"		
IC28	TC4071BP	"		
IC29	TC4011BP	"		
IC30	TC40103BP	"		
IC31	"	"		
IC32	"	"		
IC33	"	"		
IC34	TC4069UBP	"		
IC35	TC4013BP	"		
IC40	AN301	"		
IC41	"	"		
Q 1	2SC2647C	Transistor		
Q 2	"	"		
Q 3	"	"		
Q 4	"	"		
Q 5	"	"		
Q 6	"	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"		
Q10	"	"		
D 1	MA150	Diode		
D 2	"	"		
D 3	"	"		
D 4	"	"		
D 5	"	"		
R 1	QRD167J-103	CR		
R 2	" -103	"		
R 3	" -750	"		
R 4	" -100	"		
R 5	" -332	"		
R 6	" -102	"		

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R 7	QRD167J-333	CR		
R 8	" -103	"		
R 9	" -103	"		
R10	" -332	"		
R11	" -102	"		
R12	" -822	"		
R13	" -222	"		
R14	" -151	"		
R15	PU55509-102	VR		
R16	QRD167J-623	CR		
R17	" -822	"		
R18	" -823	"		
R19	" -103	"		
R20	PU55509-222	VR		
R21	QRD167J-392	CR		
R22	QRD167G-472	"		
R23	" -222	"		
R24	QRD167J-103	"		
R25	" -103	"		
R26	" -103	"		
R27	" -332	"		
R28	" -102	"		
R29	" -333	"		
R30	" -103	"		
R31	" -103	"		
R32	" -332	"		
R33	" -102	"		
R34	" -822	"		
R35	" -222	"		
R36	" -151	"		
R37	PU55509-102	VR		
R38	QRD167J-623	CR		
R39	" -822	"		
R40	" -823	"		
R41	" -103	"		
R42	PU55509-222	VR		
R43	QRD167J-392	CR		
R44	QRD167G-472	"		
R45	" -222	"		
R46	QRD167J-472	"		
R47	PU55509-103	VR		
R48	QRD167J-273	CR		
R49	PU55509-224	VR		
R50	QRD167J-394	CR		
R51	QRD167G-363	"		
R52	QRD167J-395	"		
R53	" -103	"		
R54	" -103	"		
R55	" -153	"		
R56	" -103	"		
R57	" -103	"		
R58	PU55509-103	VR		
R59	QRD167J-103	CR		
R60	" -475	"		
R61	" -395	"		
R62	" -103	"		
R63	" -102	"		
R64	" -224	"		
R65	" -224	"		
R66	" -103	"		
R67	" -224	"		
R68	" -224	"		
R69	" -224	"		
R70	" -102	"		
R71	" -102	"		

Symbol No.	Part No.	Part Name	Note	Description
R72	–	–		
R73	–	–		
R74	–	–		
R75	–	–		
R76	–	–		
R77	–	–		
R78	QRD167J-183	CR		
R79	–	–		
R80	QRD167J-332	CR		
R81	" -682	"		
R82	" -333	"		
R84	" -682	"		
R84	" -474	"		
R100	QRD167J-152	CR		
R101	" -152	"		
RA 1	EXB-P85224M	Resistor Array		
C 1	QEK51CM-106	E Cap		
C 2	" -106	"		
C 3	QCS11HJ-100	C Cap		
C 4	QCF11EZ-103	"		
C 5	QEV61CR-107	E Cap		
C 6	QFN41HJ-103	MY Cap		
C 7	QCS11HJ-151	C Cap		
C 8	QFN41HJ-103	MY Cap		
C 9	" -102	"		
C10	QEK51HM-105	E Cap		
C11	QEV61CR-107	"		
C12	" -336	"		
C13	" -476	"		
C14	QCS11HJ-100	C Cap		
C15	QET51CM-336	E Cap		
C16	QEK51CM-106	"		
C17	" -106	"		
C18	QCS11HJ-100	C Cap		
C19	QCF11EZ-223	"		
C20	QEV61CR-107	E Cap		
C21	QFN41HJ-103	MY Cap		
C22	QCS11HJ-151	C Cap		
C23	QFN41HJ-103	MY Cap		
C24	" -102	"		
C25	QEK51HM-105	E Cap		
C26	QEV61CR-107	"		
C27	" -336	"		
C28	" -476	"		
C29	QCS11HJ-100	C Cap		
C30	QET51CM-336	E Cap		
C31	QEK51HM-105	"		
C32	QEE41VM-684	T Cap		
C33	" -684	"		
C34	QCF11EZ-103	C Cap		
C35	QET41CM-477	E Cap		
C36	QCF11EZ-223	C Cap		
C37	QEV61CR-107	E Cap		
C38	QFN41HJ-102	MY Cap		
C39	QCF11EZ-223	C Cap		
C40	QET41CM-477	E Cap		
C41	QEK51EM-106	"		
C42	–	–		
C43	–	–		
C44	–	–		
C45	QFN41HJ-103	MY Cap		
C46	QEV61CR-107	E Cap		
C47	–	–		
C48	–	–		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C49	–	–		
C50	QFN41HJ-103	MY Cap		
C51	QEV61CR-107	E Cap		
C52	QEK51EM-106	"		
C100	QCS11HJ-151	C Cap		
C101	" -220	"		
C102	QEE41VM-474	T Cap		
C103	QCS11HJ-151	C Cap		
C104	" -220	"		
C105	QEE41VM-474	T Cap		
L 1	PU30771-3	Coil		
L 2	" -11	"		
L 3	" -3	"		
L 4	" -11	"		
L 5	PU48530-221K	Peaking Coil		
L 6	" -221K	"		
L 7	" -221K	"		
L 8	" -221K	"		
L 9	" -221K	"		
L10	" -221K	"		
L11	" -221K	"		
L12	" -221K	"		
L13	" -221K	"		
L14	" -221K	"		
L15	" -221K	"		
L16	" -221K	"		
L17	" -221K	"		
L18	" -221K	"		
LC 1	PU30770-5	Coil (LC Block)		
LC 2	" -5	"		
BPF 1	PU30190-4	B.P.F.		
BPF 2	" -4	"		
P221	PU43351-10R	Cap. Housing		
P222	" -2R	"		
P223	" -3Y	"		
P224	" -3R	"		
P225	" -2Y	"		
J226	PU45380-16	Cap. Housing		
J227	" -16	"		
TP	PU53460	Test Point		TP1–43, TP45–47, TP58–61

8.16 COLOR FRAME WARING BOARD ASS'Y 2 3
CR-8250E PU21673A

Symbol No.	Part No.	Part Name	Note	Description
IC 1	TC40103BP	Integrated Circuit		
IC 2	TC4538BP	"		
IC 3	TC4081BP	"		
IC 4	TC4013BP	"		
IC 5	TC4082BP	"		
IC 6	TC4017BP	"		
IC 7	TC40103BP	"		
IC 8	"	"		
IC 9	TC4071BP	"		
IC10	TC4013BP	"		
IC11	TC4011BP	"		
IC12	TC40103BP	"		
IC13	TC4069UBP	"		
IC14	TC4044BP	"		
IC15	TC4013BP	"		
IC16	TC4069UBP	"		
IC17	TC40103BP	"		
IC18	TC4071BP	"		
IC19	TC4081BP	"		
IC20	TC40103BP	"		
IC21	TC4001BP	"		
IC22	TC40103BP	"		
IC23	TC4013BP	"		
IC24	TC40103BP	"		
IC25	TC4020BP	"		
IC26	TC4521BP	"		
R 1	QRD167J-224	CR		
R 2	" -224	"		
R 3	" -224	"		
R 4	" -102	"		
R 5	" -105	"		
R 6	" -682	"		
R 7	" -103	"		
C 1	QFN41HJ-103	MY Cap		
C 2	QET41CM-337	E Cap		
C 3	QCF11HP-223	C Cap		
C 4	" -223	"		
C 5	" -223	"		
C 6	" -223	"		
C 7	" -223	"		
C 8	" -223	"		
C 9	" -223	"		
C10	" -223	"		
C11	" -223	"		
C12	" -223	"		
C13	" -223	"		
C14	" -223	"		
C15	QCT05CH-330	"		
C16	" -330	"		
CF 1	PU55316	Ceramic Resonator		
L 1	PU48530-221K	Peaking Coil		
J231	PU51945-16	Housing		
J232	" -16	"		
TP	PU45908-2	Test Point		TP70–80

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.17 VIDEO SUB BOARD ASS'Y $\boxed{2}\boxed{5}$
CR-8250E : PU33731C CR-6650E : PU33731D
CP-5550E : PU33731E

Symbol No.	Part No.	Part Name	Note	Description
Q101	2SC2647C	Transistor	◎☆	
Q102	"	"	◎☆	
Q51	2SC2647C	Transistor	□ ◎	
Q52	"	"	□ ◎	
Q53	"	"	□ ◎	
Q54	"	"	□ ◎	
Q55	2SK30A-O	F.E.T.	□ ◎	
D 1	1S1926-M	Diode	□ ◎	
D 2	" -M	"	□ ◎	
D 3	1SS133	"	□ ◎	
R101	QRD167J-470	CR	◎ ☆	
R102	" -561	"	◎ ☆	
R103	" -820	"	◎ ☆	
R104	" -560	"	◎ ☆	
R105	" -681	"	◎ ☆	
R106	" -122	"	◎ ☆	
R107	" -101	"	◎ ☆	
R108	" -472	"	◎ ☆	
R109	" -561	"	◎ ☆	
R110	" -102	"	◎ ☆	
R51	QRD167J-471	CR	□ ◎	
R52	" -562	"	□ ◎	
R53	" -222	"	□ ◎	
R54	" -103	"	□ ◎	
R55	" -273	"	□ ◎	
R56	" -823	"	□ ◎	
R57	" -682	"	□ ◎	
R58	" -221	"	□ ◎	
R59	" -221	"	□ ◎	
R60	" -562	"	□ ◎	
R61	" -222	"	□ ◎	
R62	" -472	"	□ ◎	
C101	QET41CM-476	E Cap	◎ ☆	
C102	QCF11EZ-223	C Cap	◎ ☆	
C103	QET40JM-227	E Cap	◎ ☆	
C104	QCS11HJ-560	C Cap	◎ ☆	
C105	QET40JM-227	E Cap	◎ ☆	
C106	QET41CM-107	"	◎ ☆	
C107	QCF11EZ-223	C Cap	◎ ☆	
C108	QET41CM-476	E Cap	◎ ☆	
C51	QET41AM-107	E Cap	□ ◎	
C52	QCF11EZ-223	C Cap	□ ◎	
C53	QET41CM-476	E Cap	□ ◎	
C54	QET41AM-107	"	□ ◎	
C55	QCF11EZ-223	C Cap	□ ◎	
C56	QET41CM-476	E Cap	□ ◎	
C57	QET41AM-107	"	□ ◎	
C58	QCF11EZ-223	C Cap	□ ◎	
C59	QET41CM-476	E Cap	□ ◎	
C60	QCF11EZ-223	C Cap	□ ◎	
C61	QET41CM-476	E Cap	□ ◎	
C62	QFN41HJ-683	MY Cap	□ ◎	

Symbol No.	Part No.	Part Name	Note	Description
C63	QFN41HJ-683	MY Cap	□ ◎	
C64	QCF11EZ-223	C Cap	□ ◎	
C65	QET41CM-476	E Cap	□ ◎	
C66	QET41AM-107	"	□ ◎	
L101	PU48530-1R0K	Peaking Coil	◎ ☆	
L102	" -680K	"	◎ ☆	
L103	" -221K	"	◎ ☆	
L51	PU48530-221K	Peaking Coil	□ ◎	
L52	" -221K	"	□ ◎	
L53	" -221K	"	□ ◎	
L54	" -221K	"	□ ◎	
L55	" -221K	"	□ ◎	
DL101	PU43155	Delay Line	◎ ☆	
DL102	–	–		
P251	–	–		
P252	PU43351-2	Cap. Housing	□ ◎	
P253	–	–		
P254	–	–		
P255	PU43351-3	Cap. Housing	□ ◎	
P256	" -2Y	"	□ ◎	
P257	" -3	"	□ ◎	
P258	" -2	"	□ ◎	
P259	" -2R	"	□ ◎	
P260	" -2Y	"	◎ ☆	
P261	" -2Y	"	◎ ☆	
P262	" -2	"	◎ ☆	
TP	PU48578	Test Point	□	TP1, TP2
	"	"	◎	TP1, TP2
				TP101, TP102
	"	"	☆	TP101, TP102

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.18 CAPSTAN SERVO BOARD ASS'Y $\boxed{3}\boxed{0}$

CR-8250E : PU21478C **CR-6650E : PU21478E**
CP-5550E : PU21478D

Symbol No.	Part No.	Part Name	Note	Description
IC 1	LM2907N-8	Integrated Circuit		
IC 2	UPC1458C	"		
IC 3	HA17555PS	"		
IC 4	UPC1458C	"		
IC 5	AN360	"		
IC 6	UPC1458C	"		
IC 7	TC4027BP	"	□ ⊚	
IC 8	HA17555PS	"	□ ⊚	
IC 9	TC4011BP	"		
IC10	TC4069UBP	"		
IC11	LM2907N-8	"		
IC12	TC4069UBP	"		
IC13	TC4011BP	"		
IC14	TC4017BP	"		
IC15	TC4011BP	"		
IC16	HA17555PS	"	□ ⊚	
IC17	AN6341N	"		
IC18	TC4066BP	"		
IC19	UPC1458C	"		
IC20	TC4066BP	"		
IC21	NJM2903D	"		
IC22	TA78L010AP	"		
Q 1	2SD636Q,R	Transistor		
Q 2	"	"		
Q 3	"	"		
Q 4	2SB641Q,R	"		
Q 5	2SD636Q,R	"		
Q 6	2SC1545B	"		
Q 7	—	—		
Q 8	2SD636Q,R	Transistor		
Q 9	2SC1545B	"		
Q10	2SD636Q,R	"	□ ⊚	
Q11	2SB641Q,R	"		
Q12	2SD636Q,R	"		
Q13	2SB641Q,R	"		
Q14	"	"	□ ⊚	
Q15	"	"	□ ⊚	
Q16	—	—		
Q17	2SC458D	Transistor		
Q18	—	—		
Q19	2SC1545B	Transistor		
Q20	2SD636Q,R	"		
Q21	2SD639R	"		
Q22	2SD973A,R	"		
Q23	2SB793A,R	"		
Q24	2SD389A-O	"		
Q25	2SB641Q,R	"		
Q26	2SD636Q,R	"		
Q27	"	"		
Q28	2SB641Q,R	"		
D 1	1SS133	Diode		
D 2	"	"		
D 3	—	—		
D 4	—	—		
D 5	RD3.9EB	Zener Diode		
D 6	1SS133	Diode		
D 7	"	"		
D 8	"	"	□ ⊚	
D 9	"	"	□ ⊚	
D10	"	"		
D11	"	"	□ ⊚	
D12	1SS133	Diode	□ ⊚	
D13	—	—		
D14	1SS133	Diode		
D15	"	"		
D16	"	"		
D17	RD4.7EB2	Zener Diode		
D18	—	—		
D19	1SS133	Diode		
D20	"	"		
D21	"	"		
D22	"	"		
D23	"	"		
D24	"	"		
R 1	QRD167J-472	CR		
R 2	QRV143F-1403	PMR		
R 3	QRD167J-472	CR		
R 4	QRV143F-8062	PMR		
R 5	" -2402	"		
R 6	" -2611	"		
R 7	QVP4A0B-471	VR		X5 DRUM SRCH.
R 8	QRV143F-4301	PMR		
R 9	QRD167J-472	CR		
R10	QVP4A0B-102	VR		REV. X5 DRUM SRCH.
R11	QRD167J-472	CR		
R12	QRV143F-1002	PMR		
R13	" -1052	"		
R14	QRD167J-223	CR		
R15	" -223	"		
R16	" -103	"		
R17	" -104	"		
R18	" -563	"		
R19	" -223	"		
R20	" -103	"		
R21	" -223	"		
R22	" -332	"		
R23	" -473	"		
R24	" -334	"		
R25	" -333	"		
R26	" -473	"		
R27	" -102	"		
R28	" -103	"		
R29	" -154	"		
R30	—	—		
R31	QRD167J-153	CR		
R32	" -562	"		
R33	" -103	"		
R34	" -104	"		
R35	" -104	"		
R36	" -105	"		
R37	" -104	"		
R38	" -332	"		
R39	QVP4A0B-222	VR		DC SET-1
R40	QRD167J-562	CR		
R41	" -152	"		
R42	—	—		
R43	—	—		
R44	—	—		
R45	QRD167J-561	CR		
R46	" -103	"		
R47	" -473	"		
R48	" -393	"		
R49	" -564	"		
R50	" -121	"		
R51	" -272	"		
R52	" -392	"		

□ symbol: CR-8250E only ⊚ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R53	QRD167J-103	CR		
R54	QVP4A0B-223	VR		DC SET-2
R55	QRD167J-103	CR		
R56	〃 -101	〃		
R57	〃 -563	〃		
R58	〃 -123	〃		
R59	〃 -153	〃		
R60	〃 -224	〃		
R61	〃 -222	〃		
R62	QVP4A0B-222	VR		DC SET-3
R63	QRD167J-472	CR		
R64	〃 -101	〃		
R65	〃 -333	〃		
R66	〃 -333	〃		
R67	〃 -103	〃		
R68	〃 -223	〃		
R69	〃 -224	〃		
R70	〃 -474	〃		
R71	〃 -154	〃		
R72	〃 -472	〃	□ ◎	
R73	〃 -472	〃	□ ◎	
R74	〃 -332	〃	□ ◎	
R75	〃 -473	〃	□ ◎	
R76	〃 -333	〃	□ ◎	
R77	〃 -333	〃	□ ◎	
R78	〃 -474	〃	□ ◎	
R79	QRG129J-821	OMR	□ ◎	
R80	QRD167J-182	CR	□ ◎	
R81	〃 -472	〃		
R82	QRV143F-2943	PMR		
R83	〃 -5902	〃		
R84	QRD167J-224	CR		
R85	QRV143F-1212	PMR		
R86	〃 -6811	〃		
R87	QRD167J-332	CR		
R88	〃 -103	〃		
R89	QVP4A0B-222	VR		STILL WID.
R90	QRD167J-332	CR		
R91	〃 -103	〃		
R92	〃 -104	〃		
R93	〃 -103	〃		
R94	〃 -473	〃		
R95	〃 -223	〃		
R96	〃 -473	〃		
R97	〃 -223	〃	□ ◎	
R98	QVP4A0B-224	VR	□ ◎	CAP. REC. PHASE-2
R99	QRD167J-334	CR	□ ◎	
R100	〃 -683	〃	□ ◎	
R101	〃 -103	〃	□ ◎	
R102	〃 -223	〃		
R103	〃 -102	〃		
R104	〃 -102	〃		
R105	〃 -473	〃	□ ◎	
R106	〃 -104	〃	□ ◎	
R107	—	—		
R108	—	—		
R109	QRD167J-154	CR		
R110	〃 -683	〃		
R111	QVZ3501-224	VR		SUB. TRACKING
R112	QRD167J-223	CR		
R113	〃 -223	〃		
R114	〃 -104	〃		
R115	〃 -103	〃		
R116	〃 -102	〃		
R117	QRV143F-1502	PMR		

Symbol No.	Part No.	Part Name	Note	Description
R118	QRD167J-102	CR		
R119	〃 -474	〃		
R120	〃 -274	〃		
R121	QRV143F-1212	PMR		
R122	QRD167J-683	CR		
R123	QRV143F-1002	PMR		
R124	〃 -6041	〃		
R125	—	—		
R126	QRV143F-3161	PMR		
R127	—	—		
R128	QRD167J-222	CR		
R129	QVZ3501-223	VR		DISCRIM.
R130	QRV143F-1003	PMR		
R131	QRD167J-474	CR		
R132	〃 -102	〃		
R133	QRV143F-1072	PMR		
R134	QRD167J-103	CR		
R135	〃 -222	〃		
R136	—	—		
R137	QRD167J-102	CR		
R138	〃 -333	〃		
R139	〃 -473	〃		
R140	〃 -105	〃		
R141	〃 -563	〃		
R142	〃 -103	〃		
R143	〃 -222	〃		
R144	〃 -333	〃		
R145	〃 -473	〃		
R146	〃 -103	〃		
R147	〃 -103	〃		
R148	QRD143J-392	〃		
R149	QRD167J-104	〃		
R150	〃 -103	〃		
R151	〃 -103	〃		
⚠ R152	QRZ0054-150	Fusible R		
R153	QRD167J-104	CR		
R154	—	—		
R155	QRD167J-104	CR		
R156	〃 -153	〃		
R157	〃 -103	〃		
R158	〃 -103	〃		
R159	〃 -123	〃		
R160	〃 -224	〃		
R161	〃 -473	〃	□ ◎	
R162	〃 -102	〃		
R163	〃 -222	〃		
R164	〃 -274	〃		
R165	QVZ3501-224	VR		CAP. REC. PHASE-1
R166	QRD167J-103	CR		
R167	〃 -103	〃		
R168	—	—		
R169	QRD167J-105	CR		
R170	〃 -224	〃		
R171	〃 -563	〃		
R172	〃 -821	〃		
R173	〃 -392	〃		
R174	〃 -392	〃		
R175	〃 -222	〃		
R176	〃 -223	〃		
R177	〃 -222	〃		
R178	〃 -334	〃		
R179	〃 -224	〃		
C 1	QCF11HP-103	C Cap		
C 2	QET41CM-107	E Cap		
C 3	QEE41CM-226	T Cap		
C 4	QFP42AF-272M	PP Cap		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C 5	QFN41HK-104	MY Cap		
C 6	—	—		
C 7	QET41CM-106	E Cap		
C 8	QFN41HK-103	MY Cap		
C 9	QCF11HP-103	C Cap		
C10	QET41CM-107	E Cap		
C11	QFN41HK-103	MY Cap		
C12	″ -222	″		
C13	QET41CM-106	E Cap		
C14	QCS11HJ-151	C Cap		
C15	QCF11HP-223	″		
C16	QFN41HK-103	MY Cap		
C17	QET41CM-106	E Cap		
C18	QEE41EM-105	T Cap		
C19	QEE41CM-106	″		
C20	QFN41HK-104	MY Cap		
C21	″ -103	″		
C22	QET41CM-106	E Cap		
C23	″ -106	″		
C24	QEE41CM-106	T Cap		
C25	QCF11HP-103	C Cap		
C26	QET41CM-227	E Cap		
C27	QCS11HJ-330	C Cap		
C28	QET41CM-476	E Cap		
C29	QCF11HP-103	C Cap		
C30	QET41CM-476	E Cap		
C31	QEE41EM-105	T Cap		
C32	QFN41HK-332	MY Cap		
C33	QEE41CM-106	T Cap		
C34	″ -106	″		
C35	QCS11HJ-471	C Cap		
C36	QET41CM-476	E Cap		
C37	QFN41HJ-154	MY Cap		
C38	QET41CM-106	E Cap		
C39	QEE41CM-226	T Cap		
C40	QFN41HK-222	MY Cap		
C41	QET41HM-105	E Cap		
C42	″ -105	″		
C43	QCF11HP-103	C Cap		
C44	QET41CM-227	E Cap		
C45	″ -107	″		
C46	QCF11HP-103	C Cap		
C47	QFN41HK-102	MY Cap	□ ◎	
C48	″ -103	″	□ ◎	
C49	QCF11HP-103	C Cap	□ ◎	
C50	QET41EM-107	E Cap	□ ◎	
C51	QFN41HK-103	MY Cap	□ ◎	
C52	QFM41HJ-393M	″	□ ◎	
C53	QET41EM-476	E Cap	□ ◎	
C54	QET41CM-107	″		
C55	QCF11HP-103	C Cap		
C56	″ -103	″		
C57	QET41CM-107	E Cap		
C58	QEE41CM-226	T Cap		
C59	QFP42AF-392M	PP Cap		
C60	QFN41HK-104	MY Cap		
C61	QET41CM-106	E Cap		
C62	QFN41HK-102	MY Cap		
C63	QCF11HP-103	C Cap	□ ◎	
C64	QET41CM-107	E Cap	□ ◎	
C65	QFN41HK-103	MY Cap	□ ◎	
C66	QFM41HJ-153M	″	□ ◎	
C67	QFN41HK-333	″	□ ◎	
C68	QET41CM-227	E Cap		
C69	QCF11HP-103	C Cap		

Symbol No.	Part No.	Part Name	Note	Description
C70	QFM41HJ-563M	MY Cap		
C71	QFN41HK-332	″		
C72	QFP42AF-184M	PP Cap		
C73	QFN41HK-104	MY Cap		
C74	″ -103	″		
C75	″ -102	″		
C76	QFP42AF-303M	PP Cap		
C77	″ -203M	″		
C78	QFN41HK-104	MY Cap		
C79	QEE41EM-475	T Cap		
C80	″ -475	″		
C81	QFN41HK-103	MY Cap		
C82	″ -103	″		
C83	QET41EM-106	E Cap		
C84	QCF11HP-223	C Cap		
C85	QET41CM-107	E Cap		
C86	QET41HM-476	″		
C87	QCF11HP-223	C Cap		
C88	″ -223	″	□ ◎	
C89	—	—		
C90	QFM41HJ-273M	MY Cap		
C91	QET41EM-475	E Cap		
C92	QFN41HK-103	MY Cap		
L 1	PU48530-271K	Peaking Coil		
L 2	″ -271K	″		
L 3	″ -271K	″		
L 4	″ -271K	″		
L 5	″ -271K	″		
L 6	″ -271K	″		
L 7	″ -271K	″	□ ◎	
L 8	″ -271K	″		
RA 1	EXB-P85224M	Resistor Array		
P301	PU43351-3	Cap. Housing		
P302	″ -6R	″		
P303	″ -3R	″		
P304	″ -3Y	″		
P305	″ -2	″	□ ◎	
P306	″ -12	″		
P307	″ -3	″		
P308	″ -5Y	″		
TP	PU46443	Test Point		TP1—31

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.19 DRUM SERVO CIRCUIT BOARD ASS'Y 3 2
CR-8250E PU21479B
CR-6650E, CP-5550E PU21479C

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN301	Integrated Circuit		
IC 2	TC4011BP	"		
IC 3	TC4069UBP	"		
IC 4	TC4011BP	"		
IC 5	AN301	"		
IC 6	HA17555PS	"		
IC 7	TC4011BP	"		
IC 8	HA17555PS	"		
IC 9	AN6342N	"		
IC10	AN6344	"		
IC11	UPC741C	"		
IC12	4VT01	"		
IC13	NJM2903D	"		
IC14	UPC1458C	"		
IC15	TC4011BP	"		
Q 1	2SC1545B	Transistor		
Q 2	"	"		
Q 3	2SD636Q,R	"		
Q 4	2SB641Q,R	"		
Q 5	"	"		
Q 6	2SD636Q,R	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"		
Q10	2SK30A-O	F.E.T.		
Q11	2SD636Q,R	Transistor		
Q12	2SB641Q,R	"		
Q13	2SD636Q,R	"		
Q14	2SK30A-O	F.E.T.		
Q15	2SB641Q,R	Transistor		
Q16	2SD639R	"		
Q17	2SD973A,R	"		
Q18	2SB793A,R	"		
Q19	2SD389A,O	"		
Q20	"	"		
Q21	2SK30A-O	F.E.T.		
Q22	2SD636Q,R	Transistor		
Q23	2SB641Q,R	"		
Q24	2SD636Q,R	"		
Q25	2SC1545B	"		
D 1	1SS133	Diode		
D 2	"	"		
D 3	"	"		
D 4	"	"		
D 5	"	"		
D 6	"	"		
D 7	"	"		
D 8	"	"		
D 9	"	"		
D10	"	"		
D11	"	"		
D12	"	"		
D13	"	"		
D14	"	"		
D15	"	"		
D16	"	"		
D17	–	–		
D18	1SS133	Diode		
D19	"	"		
D20	"	"		
D21	"	"		
D22	"	"		

Symbol No.	Part No.	Part Name	Note	Description
D23	1SS133	Diode		
D24	"	"		
D25	"	"		
R 1	QRD167J-152	CR		
R 2	" -684	"		
R 3	" -103	"		
R 4	" -104	"		
R 5	" -103	"		
R 6	" -103	"		
R 7	" -563	"		
R 8	" -223	"		
R 9	" -153	"		
R10	" -563	"		
R11	" -223	"		
R12	" -153	"		
R13	" -682	"		
R14	" -153	"		
R15	" -153	"		
R16	" -104	"		
R17	" -102	"		
R18	" -563	"		
R19	" -104	"		
R20	" -473	"		
R21	–	–		
R22	QRD167J-332	CR		
R23	" -390	"		
R24	" -390	"		
R25	" -152	"		
R26	" -273	"		
R27	" -564	"		
R28	" -103	"		
R29	" -103	"		
R30	" -474	"		
R31	" -103	"		
R32	" -223	"		
R33	" -104	"		
R34	" -102	"		
R35	" -563	"		
R36	" -104	"		
R37	" -473	"		
R38	" -103	"		
R39	–	–		
R40	QRV143F-3572	PMR		
R41	QRD167J-103	CR		
R42	" -103	"		
R43	" -564	"		
R44	" -103	"		
R45	" -103	"		
R46	" -223	"		
R47	QVZ3501-223	VR		FRAME ADJ.
R48	QRV143F-8062	PMR		
R49	QRD167J-473	CR		
R50	" -473	"		
R51	" -223	"		
R52	" -563	"		
R53	" -473	"		
R54	QRD143J-221	"		
R55	QRD167J-563	"		
R56	" -472	"		
R57	" -332	"		
R58	" -823	"		
R59	" -103	"		
R60	" -222	"		
R61	" -221	"		
R62	" -334	"		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R63	QRD167J-105	CR		
R64	″ -564	″		
R65	″ -105	″		
R66	QVP4A0B-473	VR		P.B. SW 1
R67	QRD167J-183	CR		
R68	QVP4A0B-473	VR		P.B. SW 2
R69	QRD167J-183	CR		
R70	″ -331	″		
R71	QVZ3501-104	VR		REC. SW POINT
R72	QRD167J-184	CR		
R73	″ -103	″		
R74	QRV143F-1212	PMR		
R75	QRD167J-332	CR		
R76	″ -103	″		
R77	″ -101	″		
R78	″ -100	″		
R79	QRV143F-2873	PMR		
R80	″ -2873	″		
R81	″ -1433	″		
R82	″ -5111	″		
R83	–	–		
R84	QRV143F-9102	PMR		
R85	QVZ3501-103	VR		DISCRIM.
R86	QRD167J-332	CR		
R87	″ -221	″		
R88	″ -823	″		
R89	″ -103	″		
R90	″ -103	″		
R91	″ -474	″		
R92	″ -823	″		
R93	″ -682	″		
R94	QRV143F-4021	PMR		
R95	″ -3161	″		
R96	QRD167J-104	CR		
R97	″ -103	″		
R98	″ -474	″		
R99	″ -224	″		
R100	″ -103	″		
R101	″ -100	″		
R102	″ -100	″		
R103	″ -100	″		
R104	″ -101	″		
R105	″ -105	″		
R106	″ -334	″		
R107	″ -222	″		
R108	″ -223	″		
R109	″ -473	″		
R110	″ -103	″		
R111	″ -103	″		
R112	″ -472	″		
R113	QRX016J-1R0M	MFR		
R114	QRD167J-181	CR		
⚠ R115	QRZ0054-150	Fusible R		
R116	QRD167J-100	CR		
R117	″ -103	″		
R118	″ -332	″		
R119	″ -103	″		
R120	″ -123	″		
R121	″ -103	″		
R122	″ -153	″		
R123	″ -103	″		
R124	″ -103	″		
R125	″ -103	″		
R126	″ -224	″		
R127	″ -100	″		

Symbol No.	Part No.	Part Name	Note	Description
R128	QRD167J-103	CR		
R129	″ -102	″		
R130	″ -333	″		
R131	″ -223	″		
R132	″ -563	″		
R133	″ -563	″		
R134	″ -103	″		
R135	″ -103	″		
R136	QVP4A0B-473	VR		H. PHASE
R137	QRD167J-103	CR		
R138	″ -224	″		
R139	″ -104	″		
R140	″ -104	″		
R141	″ -103	″		
R142	″ -473	″		
R143	″ -224	″		
R144	″ -683	″		
R145	″ -104	″		
R146	″ -104	″		
R147	″ -104	″		
R148	″ -104	″		
R149	″ -273	″		
R150	″ -473	″		
R151	″ -123	″		
R152	″ -224	″		
R153	″ -224	″		
R154	″ -102	″		
R155	″ -563	″		
C 1	QET41CM-476	E Cap		
C 2	QCS11HJ-151	C Cap		
C 3	″ -220	″		
C 4	QEE41VM-474	T Cap		
C 5	QFN41HK-683	MY Cap		
C 6	QCF11HP-103	C Cap		
C 7	QET41CM-227	E Cap		
C 8	QFN41HK-103	MY Cap		
C 9	″ -103	″		
C10	″ -103	″		
C11	″ -102	″		
C12	–	–		
C13	–	–		
C14	QCS11HJ-561	C Cap		
C15	″ -561	″		
C16	QET41HM-105	E Cap		
C17	″ -105	″		
C18	QET41CM-227	″		
C19	QCF11HP-103	C Cap		
C20	QET41CM-476	E Cap		
C21	QCS11HJ-151	C Cap		
C22	QFN41HK-222	MY Cap		
C23	QCS11HJ-220	C Cap		
C24	QEE41VM-474	T Cap		
C25	QFN41HK-393	MY Cap		
C26	QCF11HP-103	C Cap		
C27	QET41CM-227	E Cap		
C28	QFN41HK-103	MY Cap		
C29	″ -103	″		
C30	″ -333	″		
C31	″ -103	″		
C32	QET41HM-105	E Cap		
C33	″ -105	″		
C34	QFN41HK-103	MY Cap		
C35	QCS11HJ-221	C Cap		
C36	QET41CM-227	E Cap		
C37	QCF11HP-103	C Cap		
C38	QFN41HK-103	MY Cap		
C39	QFP42AF-102M	PP Cap		
C40	QCS11HJ-331	C Cap		

□ symbol: CR-8250E only　　◎ symbol: CR-6650E only　　☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C41	QFN41HK-332	MY Cap		
C42	QCF11HP-103	C Cap		
C43	QET41CM-227	E Cap		
C44	QFN41HK-103	MY Cap		
C45	QFP42AG-682M	PP Cap		
C46	–	–		
C47	QET41CM-227	E Cap		
C48	QCF11HP-103	C Cap		
C49	QCS11HJ-471	"		
C50	QFN41HK-103	MY Cap		
C51	QCS11HJ-150	C Cap		
C52	QET41CM-227	E Cap		
C53	QCF11HP-103	C Cap		
C54	QCS11HJ-221	"		
C55	" -101	"		
C56	QET41HM-105	E Cap		
C57	QCF11HP-103	C Cap		
C58	QET41CM-107	E Cap		
C59	QFN41HK-104	MY Cap		
C60	QET41HM-105	E Cap		
C61	" -105	"		
C62	QFM41HJ-473M	MY Cap		
C63	" -473M	"		
C64	" -123M	"		
C65	QFN41HK-102	"		
C66	QFP42AG-823M	PP Cap		
C67	QFN41HK-104	MY Cap		
C68	QET41CM-477	E Cap		
C69	QCF11HP-103	C Cap		
C70	–	–		
C71	QFP42AF-223M	PP Cap		
C72	" -223M	"		
C73	" -433M	"		
C74	QFN41HK-104	MY Cap		
C75	QFP42AF-472M	PP Cap		
C76	–	–		
C77	QFP42AF-682M	PP Cap		
C78	QET41HM-105	E Cap		
C79	" -105	"		
C80	–	–		
C81	QEE41CM-685	T Cap		
C82	QFN41HK-333	MY Cap		
C83	QEE81EM-156	T Cap		
C84	" -156	"		
C85	QFN41HK-393	MY Cap		
C86	" -103	"		
C87	QET41EM-106	E Cap		
C88	QET41HM-105	"		
C89	QCF11HP-223	C Cap		
C90	" -223	"		
C91	QET41CM-107	E Cap		
C92	" -476	"		
C93	QET41HM-107	"		
C94	QCF11HP-103	C Cap		
C95	QET41HM-476	E Cap		
C96	QFM41HJ-332M	MY Cap		
C97	QCF11HP-223	C Cap		
C98	QCS11HJ-101	"		
C99	" -221	"		
C100	QFN41HK-103	MY Cap		
C101	" -103	"		
C102	QCF11HP-223	C Cap		
C103	QET41CM-476	E Cap		
C104	QCS11HJ-680	C Cap		
C105	QET41HM-475	E Cap		

Symbol No.	Part No.	Part Name	Note	Description
C106	QET41HM-105	E Cap		
C107	QFN41HK-333	MY Cap		
L 1	PU48530-271K	Peaking Coil		
L 2	" -271K	"		
L 3	" -271K	"		
L 4	" -271K	"		
L 5	" -271K	"		
L 6	" -271K	"		
L 7	" -271K	"		
L 8	PU30284-51R	Choke Coil		
L 9	" -1R	"		
L10	PU48530-271K	Peaking Coil		
X 1	PU31449-2	Crystal		
	PU48665-2	Heat Sink		for Q19
	PU45375	Insulator		
	PU41624-6	Isolation Washer		
	DPSP3006Z	Screw		
	DPSP3010ZS	"		
P321	PU43351-6Y	Cap. Housing		
P322	" -6	"		
P323	" -2Y	"		
P324	" -2	"		
P325	" -5	"		
P326	" -2	"		
P327	" -2	"		
P328	" -3R	"		
P329	" -9R	"		
P330	" -3	"		
P331	–	–		
P332	PU43351-5	Cap. Housing		
P333	" -2R	"		
P334	" -4R	"		
P335	" -6	"		
P336	" -2Y	"		
SW 1	QSS2201-022	Slide Switch		
TP	PU46443	Test Point		TP1–30

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.20 AUDIO REC & ERASE BOARD ASS'Y $\boxed{3}\boxed{4}$
CR-8250E, CR-6650E PU21481B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN360	Integrated Circuit		
IC 2	"	"		
IC 3	TC4053BP	"		
Q 1	2SK30A-O	F.E.T.		
Q 2	"	"		
Q 3	2SA874Q,R	Transistor		
Q 4	"	"		
Q 5	2SC732TM-GR	"		
Q 6	2SD973A,R	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"		
Q10	"	"		
Q11	"	"		
Q12	2SC732TM-GR	"		
Q13	"	"		
Q14	"	"		
Q15	2SC1545B	"		
Q16	"	"		
Q17	2SD639R	"		
Q18	"	"		
Q19	"	"		
Q20	"	"		
Q21	"	"		
Q22	"	"		
Q23	"	"		
Q24	"	"		
Q25	"	"		
Q26	2SC2878A,B	"		
Q27	"	"		
Q28	"	"		
Q29	"	"		
Q30	"	"		
Q31	"	"		
Q32	"	"		
Q33	"	"		
Q34	"	"		
Q35	2SD637Q	"		
Q36	2SD639R	"		
Q37	2SD973A,R	"		
D 1	MA150	Diode		
D 2	–	–		
D 3	MA150	Diode		
D 4	–	–		
D 5	OA91	Diode		
D 6	"	"		
D 7	RD6.2EB2	Zener Diode		
D 8	"	"		
D 9	RD6.8EB3	"		
D10	"	"		
D11	1SS133	Diode		
D12	"	"		
D13	"	"		
D14	"	"		
D15	"	"		
D16	"	"		
D17	"	"		
D18	"	"		
D19	"	"		
D20	"	"		
D21	"	"		

Symbol No.	Part No.	Part Name	Note	Description
D22	1SS133	Diode		
D23	RD7.5EB2	Zener Diode		
D24	"	"		
R 1	QVP4A0B-473	VR		CH-1 MIC. LEV.
R 2	" -473	"		CH-2 MIC. LEV.
R 3	" -472	"		CH-1 LIM. LEV.
R 4	" -472	"		CH-2 LIM. LEV.
R 5	" -103	"		CH-1 REC. LEV.
R 6	" -103	"		CH-2 REC. LEV.
R 7	" -104	"		CH-1 BIAS ADJ.
R 8	" -104	"		CH-2 BIAS ADJ.
R 9	QRD167J-183	CR		
R10	" -823	"		
R11	" -681	"		
R12	QRD143J-155	"		
R13	QRD167J-121	"		
R14	" -123	"		
R15	" -221	"		
R16	QRD161J-101	"		
R17	QRD167J-822	"		
R18	" -105	"		
R19	" -105	"		
R20	QRD143J-185	"		
R21	QRD167J-101	"		
R22	" -683	"		
R23	" -563	"		
R24	" -122	"		
R25	" -472	"		
R26	" -272	"		
R27	" -682	"		
R28	" -103	"		
R29	" -183	"		
R30	" -183	"		
R31	" -332	"		
R32	" -103	"		
R33	" -184	"		
R34	" -473	"		
R35	" -562	"		
R36	" -181	"		
R37	" -182	"		
R38	QRD161J-183	"		
R39	QRD167J-391	"		
R40	" -103	"		
R41	" -105	"		
R42	" -105	"		
R43	" -224	"		
R44	" -224	"		
R45	" -562	"		
R46	" -103	"		
R47	" -103	"		
R48	QRD161J-104	"		
R49	QRD167J-104	"		
R50	" -224	"		
R51	" -224	"		
R52	" -562	"		
R53	" -681	"		
R54	QRD143J-155	"		
R55	QRD167J-183	"		
R56	" -823	"		
R57	" -123	"		
R58	" -822	"		
R59	" -221	"		
R60	QRD161J-101	"		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R61	QRD167J-105	CR		
R62	″ -105	″		
R63	″ -101	″		
R64	QRD143J-185	″		
R65	QRD167J-683	″		
R66	″ -563	″		
R67	″ -122	″		
R68	″ -272	″		
R69	″ -472	″		
R70	″ -682	″		
R71	″ -103	″		
R72	″ -183	″		
R73	″ -183	″		
R74	″ -332	″		
R75	″ -103	″		
R76	″ -184	″		
R77	″ -562	″		
R78	QRD161J-183	″		
R79	QRD167J-103	″		
R80	″ -181	″		
R81	″ -473	″		
R82	″ -182	″		
R83	″ -153	″		
R84	″ -562	″		
R85	″ -562	″		
R86	″ -821	″		
R87	″ -682	″		
R88	″ -682	″		
R89	QRG129J-220M	OMR		
R90	QRD167J-153	CR		
R91	″ -682	″		
R92	″ -682	″		
R93	″ -562	″		
R94	″ -562	″		
R95	″ -821	″		
R96	QRX129J-3R3	MFR		
R97	QRD129J-220M	OMR		
R98	QRD167J-153	CR		
R99	″ -562	″		
R100	″ -562	″		
R101	″ -821	″		
R102	″ -682	″		
R103	″ -682	″		
R104	QRX129J-4R7	MFR		
R105	QRD167J-102	CR		
R106	″ -124	″		
R107	″ -102	″		
R108	″ -823	″		
R109	″ -822	″		
R110	″ -123	″		
R111	″ -223	″		
R112	″ -472	″		
R113	″ -123	″		
R114	″ -682	″		
R115	″ -823	″		
R116	″ -333	″		
R117	″ -823	″		
R118	″ -333	″		
R119	″ -823	″		
R120	″ -103	″		
R121	″ -333	″		
R122	″ -332	″		
R123	″ -333	″		
R124	″ -103	″		
R125	″ -682	″		
R126	QRD167J-153	CR		
R127	″ -332	″		
R128	″ -103	″		
R129	″ -823	″		
R130	″ -333	″		
R131	″ -103	″		
R132	″ -332	″		
R133	″ -103	″		
R134	″ -333	″		
R135	″ -682	″		
R136	″ -153	″		
R137	″ -332	″		
R138	″ -103	″		
R139	″ -564	″		
R140	″ -124	″		
R141	″ -103	″		
R142	″ -103	″		
R143	″ -273	″		
R144	″ -333	″		
R145	″ -333	″		
R146	″ -124	″		
R147	″ -564	″		
R148	″ -103	″		
R149	″ -103	″		
R150	″ -273	″		
R151	″ -333	″		
R152	″ -333	″		
R153	″ -153	″		
R154	″ -153	″		
R155	″ -823	″		
R156	″ -332	″		
R157	″ -333	″		
R158	QRD161J-391	″		
R159	QRD167J-682	″		
R160	″ -121	″		
R161	QRD161J-272	″		
R162	″ -272	″		
R163	QRD167J-102	″		
R164	″ -103	″		
R165	″ -103	″		
R166	QRD161J-822	″		
R167	″ -822	″		
R168	″ -821	″		
R169	″ -821	″		
C 1	QEB41EM-475	LL Cap		
C 2	QCS11HJ-560	C Cap		
C 3	QFN41HK-102	MY Cap		
C 4	QET41CM-226	E Cap		
C 5	″ -476	″		
C 6	″ -107	″		
C 7	″ -106	″		
C 8	″ -476	″		
C 9	QFN41HK-103	MY Cap		
C10	QET41CM-226	E Cap		
C11	″ -226	″		
C12	QFN41HJ-224	MY Cap		
C13	QET41EM-475	E Cap		
C14	QFN41HJ-153	MY Cap		
C15	QCS11HJ-270	C Cap		
C16	QET41EM-475	E Cap		
C17	″ -476	″		
C18	QCS11HJ-391	C Cap		
C19	QFP42AJ-333	PP Cap		
C20	QFN41HK-682	MY Cap		
C21	″ -682	″		
C22	QET41CM-106	E Cap		
C23	QET41EM-107	″		
C24	QEE41VM-474	T Cap		
C25	QFP42AJ-392	PP Cap		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C26	QFP42AJ-222	PP Cap		
C27	QET41CM-476	E Cap		
C28	QET41VM-107	"		
C29	QCS11HJ-101	C Cap		
C30	QET41CM-106	E Cap		
C31	QCS11HJ-101	C Cap		
C32	QET41CM-106	E Cap		
C33	QFP42AJ-333	PP Cap		
C34	QFN41HK-682	MY Cap		
C35	" -682	"		
C36	QET41CM-106	E Cap		
C37	QFN41HK-682	MY Cap		
C38	" -682	"		
C39	QET41CM-106	E Cap		
C40	QFP32XK-473	PP Cap		
C41	QET41CM-475	E Cap		
C42	" -475	"		
C43	QEB41EM-475	LL Cap		
C44	QCS11HJ-560	C Cap		
C45	QFN41HK-102	MY Cap		
C46	QET41CM-226	E Cap		
C47	" -476	"		
C48	" -107	"		
C49	" -106	"		
C50	QFN41HK-103	MY Cap		
C51	QET41CM-476	E Cap		
C52	" -226	"		
C53	" -226	"		
C54	QFN41HJ-224	MY Cap		
C55	QET41EM-475	E Cap		
C56	QCS11HJ-270	C Cap		
C57	QET41EM-475	E Cap		
C58	QFN41HJ-153	MY Cap		
C59	QCS11HJ-391	C Cap		
C60	QET41CM-476	E Cap		
C61	" -476	"		
C62	QET41EM-475	"		
C63	QEE41AM-156	T Cap		
C64	QET41CM-476	E Cap		
C65	" -476	"		
C66	QET41EM-475	"		
C67	QEE41AM-156	T Cap		
C68	QEE41EM-155	"		
C69	QET41HM-105	E Cap		
C70	QET41CM-106	"		
C71	QEE41EM-155	T Cap		
C72	QET41HM-105	E Cap		
C73	QET41CM-106	"		
C74	QET41HM-105	"		
C75	QET41EM-476	"		
C76	" -475	"		
C77	" -475	"		
C78	QET41VM-227	"		
C79	QET41EM-475	"		
C80	" -475	"		
L 1	PU30771-9	Coil		CH-1 REC EQ
L 2	" -9	"		CH-2 "
L 3	" -2	"		CH-1 BIAS TRAP
L 4	" -2	"		CH-2 "
L 5	" -9	"		
T 1	PU48633	Buffer Trans.		
T 2	"	"		
T 3	"	"		

Symbol No.	Part No.	Part Name	Note	Description
P341	PU43351-4	Cap. Housing		
P342	" -106	"		
P343	" -2R	"		
P344	" -4Y	"		
P345	" -4R	"		
P346	" -6	"		
P347	" -5Y	"		
P348	" -4R	"		
P349	" -4Y	"		
P350	" -4	"		
P351	" -2	"		
P352	" -8	"		
P353	" -2	"		
P354	" -4	"		
P355	" -4	"		
TP	PU50766	Test Point		TP1–19

□ symbol: CR-8250E only   ◎ symbol: CR-6650E only   ☆ symbol: CP-5550E only

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CR-8250E, CR-6650E PU21482A
CP-5550E PU21482B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	AN360	Integrated Circuit		
IC 2	"	"		
IC 3	LA4220	"		
IC 4	"	"		
IC 5	"	"		
IC 6	TC4053BP	"	□ ◎	
Q 1	2SC732TM-GR	Transistor	□ ◎	
Q 2	"	"	□ ◎	
Q 3	"	"	□ ◎	
	2SC2878A,B	"	☆	
Q 4	2SC732TM-GR	"	□ ◎	
	2SC2878A,B	"	☆	
Q 5	2SC732TM-GR	"		
Q 6	"	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"	□ ◎	
Q10	"	"	□ ◎	
Q11	2SC2878A,B	"		
Q12	"	"		
Q13	2SA874Q,R	"		
Q14	"	"		
Q15	2SD638R	"		
Q16	"	"		
Q17	2SB643R	"		
Q18	"	"		
Q19	2SC2878A,B	"		
Q20	"	"		
Q21	2SD1253A,P,O	"		
Q22	2SD973A,R	"		
Q23	2SC2878A,B	"		
Q24	"	"		
D 1	OA91	Diode	□ ◎	
D 2	"	"	□ ◎	
D 3	"	"	□ ◎	
D 4	"	"	□ ◎	
D 5	WO3C	"	□ ◎	
D 6	"	"	□ ◎	
R 1	QVP4A0B-102	VR		CH-1 PB EQ
R 2	" -102	"		CH-2 "
R 3	" -223	"	□ ◎	CH-1 C.T.C.
R 4	" -223	"	□ ◎	CH-2 "
R 5	" -473	"		CH-1 PB LEV.
R 6	" -473	"		CH-2 "
R 7	" -102	"	□ ◎	CH-1 LINE LEV.
	QRD167J-561	CR	☆	
R 8	QVP4A0B-102	VR	□ ◎	CH-2 LINE LEV.
	QRD167J-561	CR	☆	
R 9	QVP4A0B-332	VR	□ ◎	CH-1 METER
R10	" -332	"	□ ◎	CH-2 "
R11	QRD167J-473	CR		
R12	" -473	"		
R13	" -821	"		
R14	" -821	"		
R15	" -121	"		
R16	" -121	"		
R17	" -123	"	□ ◎	
R18	" -123	"	□ ◎	
R19	" -104	"		
R20	" -104	"		
R21	" -823	"		
R22	" -823	"		
R23	" -183	"		
R24	" -183	"		
R25	" -102	"		

Symbol No.	Part No.	Part Name	Note	Description
R26	QRD167J-102	CR		
R27	" -392	"	□ ◎	
R28	" -392	"	□ ◎	
R29	" -682	"	□ ◎	
R30	" -682	"	□ ◎	
R31	" -392	"	□ ◎	
R32	" -392	"	□ ◎	
R33	" -823	"	□ ◎	
	" -103	"	☆	
R34	" -823	"	□ ◎	
	" -103	"	☆	
R35	" -473	"	□ ◎	
R36	" -473	"	□ ◎	
R37	QRD161J-272	"	□ ◎	
	QRD167J-272	"	☆	
R38	QRD161J-272	"	□ ◎	
	QRD167J-272	"	☆	
R39	" -103	"	□ ◎	
	" -823	"	☆	
R40	QRD161J-103	"	□ ◎	
R41	QRD167J-102	"	□ ◎	
R42	" -102	"	□ ◎	
	" -823	"	☆	
R43	" -564	"	□ ◎	
R44	" -564	"	□ ◎	
R45	" -272	"		
R46	" -272	"		
R47	" -333	"		
R48	" -333	"		
R49	" -184	"		
R50	" -184	"		
R51	" -184	"		
R52	" -184	"		
R53	" -103	"		
R54	" -103	"		
R55	" -472	"		
R56	" -472	"		
R57	" -822	"		
R58	" -822	"		
R59	" -472	"		
R60	" -472	"		
R61	" -222	"		
R62	" -222	"		
R63	" -104	"		
R64	" -104	"		
R65	" -104	"		
R66	" -104	"		
R67	" -102	"	□ ◎	
	" -332	"	☆	
R68	" -102	"	□ ◎	
	" -332	"	☆	
R69	QRG129J-680M	OMR		
R70	" -680M	"		
R71	QRD167J-332	CR		
R72	" -332	"		
R73	" -124	"		
R74	" -124	"		
R75	" -222	"	□ ◎	
R76	" -222	"	□ ◎	
R77	" -683	"		
R78	" -683	"		
R79	" -563	"		
R80	" -563	"		
R81	" -273	"		
R82	" -273	"		
R83	" -563	"		
R84	" -563	"		
R85	QRD123J-100	"		
R86	" -100	"		
R87	" -100	"		
R88	" -100	"		
R89	QRD143J-101	"		
R90	" -101	"		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R91	QRD167J-392	CR		
R92	″ -392	″		
R93	″ -333	″		
R94	″ -333	″		
R95	QRD161J-473	″		
R96	QRD167J-473	″		
R97	″ -682	″		
R98	″ -104	″		
R99	″ -104	″		
R100	″ -561	″		
R101	QRG129J-680M	OMR		
R102	QRD143J-101	CR		
R103	″ -680	″		
R104	″ -3R3	″		
R105	QRD167J-105	″	□ ◎	
R106	″ -105	″	□ ◎	
R107	″ -105	″	□ ◎	
R108	″ -105	″	□ ◎	
R109	″ -562	″	□ ◎	
R110	″ -562	″	□ ◎	
R111	″ -182	″	□ ◎	
R112	″ -182	″	□ ◎	
R113	″ -222	″		
R114	″ -102	″		
R115	″ -471	″		
R116	″ -471	″		
R117	″ -272	″		
R118	″ -272	″		
R119	QRD143J-151	″		
R120	″ -151	″		
R121	QRD167J-122	″		
R122	″ -122	″		
R123	″ -104	″		
R124	″ -104	″		
R125	″ -334	″		
R126	″ -334	″		
C 1	QCS11HJ-221	C Cap		
C 2	″ -221	″		
C 3	QEB41EM-475	LL Cap		
C 4	″ -475	″		
C 5	QCS11HJ-331	C Cap		
C 6	″ -331	″		
C 7	″ -391	″	□ ◎	
C 8	″ -391	″	□ ◎	
C 9	″ -390	″		
C10	″ -390	″		
C11	QET41CM-106	E Cap		
C12	″ -106	″		
C13	QET41EM-475	″		
C14	″ -475	″		
C15	QFN41HJ-333	MY Cap		
C16	″ -333	″		
C17	QFM41HK-122	″		
C18	″ -122	″		
C19	QET41CM-476	E Cap		
C20	″ -476	″		
C21	″ -227	″		
C22	″ -227	″		
C23	″ -476	″		
C24	″ -476	″		
C25	QFN41HJ-823	MY Cap	□ ◎	
C26	″ -823	″	□ ◎	

Symbol No.	Part No.	Part Name	Note	Description
C27	QET41EM-475	E Cap	□ ◎	
C28	″ -475	″	□ ◎	
C29	QFN41HJ-102	MY Cap		
C30	″ -102	″		
C31	QET41HM-105	E Cap	□ ◎	
C32	″ -105	″	□ ◎	
C33	QFN41HJ-123	MY Cap	□ ◎	
C34	″ -123	″	□ ◎	
C35	″ -272	″	□ ◎	
C36	″ -272	″	□ ◎	
C37	QET41CM-106	E Cap	□ ◎	
C38	″ -106	″	□ ◎	
C39	QEB41HM-105	LL Cap		
C40	″ -105	″		
C41	″ -105	″	□ ◎	
C42	″ -105	″	□ ◎	
C43	QFN41HK-332	MY Cap	□ ◎	
C44	″ -332	″	□ ◎	
C45	QCS11HJ-101	C Cap		
C46	″ -101	″		
C47	QFN41HJ-152	MY Cap		
C48	″ -152	″		
C49	QFS42BK-561	PP Cap		
C50	″ -561	″		
C51	QFN41HJ-152	MY Cap		
C52	″ -152	″		
C53	QEB41EM-475	LL Cap		
C54	″ -475	″		
C55	QET41CM-227	E Cap		
C56	″ -227	″		
C57	QET41EM-476	″		
C58	″ -476	″		
C59	QET41CM-106	″		
C60	″ -106	″		
C61	QFN41HJ-154	MY Cap		
C62	″ -154	″		
C63	QCS11HJ-220	C Cap		
C64	″ -220	″		
C65	QFN41HK-103	MY Cap		
C66	″ -103	″		
C67	QET41EM-476	E Cap		
C68	″ -476	″		
C69	QEV41CR-107	″		
C70	″ -107	″		
C71	QET41EM-475	″		
C72	″ -475	″		
C73	QET41CM-107	″		
C74	″ -107	″		
C75	″ -227	″		
C76	″ -227	″		
C77	QET41VM-227	″		
C78	″ -227	″		
C79	QET41EM-475	″		
C80	″ -475	″		
C81	QEB41EM-475	LL Cap		
C82	QET41CM-227	E Cap		
C83	QET41EM-476	″		
C84	QCS11HJ-220	C Cap		
C85	QFN41HK-103	MY Cap		
C86	QET41EM-476	E Cap		
C87	QET41CM-107	″		
C88	″ -106	″		
C89	QFN41HJ-154	MY Cap		
C90	QET41EM-107	E Cap		
C91	QET41CM-106	″	□ ◎	

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C92	QET41CM-106	E Cap	□ ◎	
C93	QCS11HJ-101	C Cap	□ ◎	
C94	〃 -101	〃	□ ◎	
C95	QET41EM-475	E Cap	□ ◎	
C96	〃 -475	〃	□ ◎	
C97	—	—		
C98	—	—		
C99	QET41VM-337	E Cap		
C100	QET41CM-337	〃		
C101	QCS11HJ-101	C Cap		
C102	〃 -560	〃		
C103	QET41EM-107	E Cap		
C104	〃 -107	〃		
L 1	PU30771-2	Coil	□ ◎	
L 2	〃 -2	〃	□ ◎	
L 3	PU49995-391	〃	□ ◎	
	PU48530-391K	Peaking Coil	☆	
L 4	PU49995-391	Coil	□ ◎	
	PU48530-391K	Peaking Coil	☆	
L 5	PU30284-22	Choke Coil	□ ◎	
L 6	〃 -22	〃	□ ◎	
RY1	PU48505	Relay		
RY2	〃	〃		
P361	PU43351-4Y	Cap. Housing		
P362	〃 -4R	〃	□ ◎	
P363	〃 -4	〃	□ ◎	
P364	〃 -6	〃		
P365	〃 -4	〃	□ ◎	
P366	〃 -4R	〃	□ ◎	
P367	〃 -2R	〃		
P368	〃 -3	〃	□ ◎	
P369	〃 -4	〃		
P370	〃 -4Y	〃	□ ◎	
P371	〃 -6	〃		
P372	〃 -6	〃	□ ◎	
P373	〃 -2	〃		
P374	〃 -2R	〃	□ ◎	
P375	〃 -2	〃	□ ◎	
P376	〃 -2	〃		
TP	PU50766	Test Point		TP1—12

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. . . . PU21480A-1

Symbol No.	Part No.	Part Name	Note	Description
IC 1	UPC358C	Integrated Circuit		
IC 2	TA7140P	〃		
IC 3	UPC358C	〃		
IC 4	〃	〃		
IC 5	〃	〃		
IC 6	TC4011BP	〃		
IC 7	TC4066BP	〃		
IC 8	〃	〃		
IC 9	〃	〃		
IC10	〃	〃		
Q 1	2SD636Q,R	Transistor		
Q 2	〃	〃		
Q 3	〃	〃		
Q 4	〃	〃		
D 1	1SS133	Diode		
D 2	〃	〃		
D 3	〃	〃		
D 4	—	—		
D 5	—	—		
D 6	1SS133	Diode		
D 7	〃	〃		
D 8	〃	〃		
D 9	〃	〃		
D10	〃	〃		
R 1	QVP4A0B-102	VR		SUP. DET. LEV.
R 2	QRD167J-561	CR		
R 3	〃 -103	〃		
R 4	〃 -103	〃		
R 5	〃 -103	〃		
R 6	〃 -103	〃		
R 7	〃 -124	〃		
R 8	〃 -472	〃		
R 9	〃 -123	〃		
R10	〃 -682	〃		
R11	〃 -332	〃		
R12	〃 -103	〃		
R13	〃 -104	〃		
R14	〃 -222	〃		
R15	QVP4A0B-222	VR		SUP. TEN. ADJ.
R16	QRD167J-222	CR		
R17	〃 -104	〃		
R18	〃 -103	〃		
R19	〃 -474	〃		
R20	—	—		
R21	QRD167J-104	CR		
R22	〃 -332	〃		
R23	〃 -332	〃		
R24	〃 -224	〃		
R25	〃 -104	〃		
R26	〃 -224	〃		
R27	〃 -104	〃		
R28	〃 -103	〃		
R29	〃 -103	〃		
R30	〃 -103	〃		
R31	〃 -153	〃		
R32	〃 -103	〃		
R33	〃 -103	〃		
R34	QRV143F-5601	PMR		
R35	〃 -6201	〃		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R36	QRD167J-103	CR		
R37	QRV143F-6041	PMR		
R38	″ -3161	″		
R39	QRD167J-103	CR		
R40	QRV143F-6041	PMR		
R41	″ -4701	″		
R42	QRD167J-103	CR		
R43	″ -474	″		
R44	″ -333	″		
R45	″ -474	″		
R46	″ -333	″		
R47	″ -103	″		
R48	″ -102	″		
R49	″ -103	″		
R50	″ -331	″		
R51	″ -471	″		
R52	″ -681	″		
R53	″ -563	″		
R54	″ -103	″		
R55	″ -332	″		
R56	QVP4A0B-472	VR		SKEW PRESET
R57	QRD167J-332	CR		
R58	″ -103	″		
R59	″ -103	″		
R60	QVP4A0B-102	VR		TU DET. LEV.
R61	QRD167J-561	CR		
R62	″ -103	″		
R63	″ -103	″		
R64	″ -103	″		
R65	″ -103	″		
R66	″ -124	″		
R67	″ -472	″		
R68	″ -122	″		
R69	″ -682	″		
R70	″ -222	″		
R71	″ -104	″		
R72	″ -103	″		
R73	″ -104	″		
R74	″ -103	″		
R75	″ -222	″		
R76	QVP4A0B-222	VR		TU TEN. ADJ.
R77	QRD167J-272	CR		
R78	″ -822	″		
R79	″ -472	″		
R80	″ -223	″		
R81	″ -103	″		
R82	″ -224	″		
R83	″ -103	″		
R84	″ -103	″		
R85	QRV143F-5601	PMR		
R86	″ -6201	″		
R87	QRD167J-103	CR		
R88	″ -333	″		
R89	″ -183	″		
R90	″ -103	″		
R91	QRV143F-6041	PMR		
R92	″ -4701	″		
R93	QRD167J-103	CR		
R94	QRV143F-6041	PMR		
R95	″ -4701	″		
R96	QRD167J-103	CR		
R97	—	—		
R98	—	—		
R99	—	—		
R100	QRD167J-224	CR		

Symbol No.	Part No.	Part Name	Note	Description
R101	QRD167J-103	CR		
R102	—	—		
R103	—	—		
R104	QRD167J-224	CR		
R105	″ -223	″		
R106	QRD161J-272	″		
R107	″ -182	″		
R108	″ -182	″		
C 1	QET41CM-107	E Cap		
C 2	QET41HM-105	″		
C 3	QET41CM-106	″		
C 4	QFN41HK-124	MY Cap		
C 5	QET41CM-106	E Cap		
C 6	QFN41HK-123	MY Cap		
C 7	QET41CM-336	E Cap		
C 8	″ -336	″		
C 9	″ -106	″		
C10	″ -106	″		
C11	QCF11HP-223	C Cap		
C12	QFN41HK-103	MY Cap		
C13	QET41CM-476	E Cap		
C14	QFN41HK-103	MY Cap		
C15	QET41CM-106	E Cap		
C16	″ -106	″		
C17	QFN41HK-223	MY Cap		
C18	QET41CM-106	E Cap		
C19	QFN41HK-563	MY Cap		
C20	″ -393	″		
C21	QET41CM-106	E Cap		
C22	″ -476	″		
C23	″ -476	″		
C24	QFV41HJ-104	TF Cap		
C25	QET41HM-105	E Cap		
C26	QET41CM-106	″		
C27	QFN41HK-124	MY Cap		
C28	QET41CM-106	E Cap		
C29	QFN41HK-123	MY Cap		
C30	QET41CM-106	E Cap		
C31	QET41EM-475	″		
C32	QFN41HJ-333	MY Cap		
C33	QET41CM-107	E Cap		
C34	″ -226	″		
C35	QFN41HJ-224	MY Cap		
C36	QET41CM-476	E Cap		
L 1	PU48530-221K	Peaking Coil		
L 2	″ -221K	″		
L 3	PU30284-44R	Coil		
L 4	PU48530-221K	Peaking Coil		
RA 1	EXB-P85224M	Resistor Array		
RA 2	″	″		
RA 3	″	″		
P401	PU43351-10R	Cap. Housing		
P402	—	—		
P403	PU43351-3	Cap. Housing		
P404	″ -4Y	″		
P405	″ -4R	″		
P406	″ -4	″		
P407	″ -2	″		
P408	″ -4	″		
TP	PU46443	Test Point		TP1—11

□ symbol: CR-8250E only ⊚ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.23 REEL DRIVE CIRCUIT BOARD ASS'Y $\boxed{4}\boxed{2}$

.... PU48544A

Symbol No.	Part No.	Part Name	Note	Description
Q 1	2SK30A-O	F.E.T.		
Q 2	2SD973AR	Transistor		
Q 3	2SK30A-O	F.E.T.		
Q 4	2SD973AR	Transistor		
D 1	V19E	Diode		
D 2	"	"		
D 3	"	"		
D 4	"	"		
D 5	"	"		
D 6	"	"		
D 7	"	"		
D 8	"	"		
R 1	QRD187J-123A	CR		
R 2	QVP9A0B-223	VR		SUP. MOT. VOLT.
R 3	QRD187J-103A	CR		
R 4	" -103A	"		
R 5	QRG016J-101	OMR		
R 6	QRD187J-103A	CR		
R 7	" -103A	"		
R 8	" -102A	"		
R 9	QRX016J-2R2	MFR		
R10	QRG016J-470	OMR		
R11	QRD187J-393A	CR		
R12	" -393A	"		
R13	" -123A	"		
R14	QVP9A0B-223	VR		TU. MOT. VOLT.
R15	QRD187J-103A	CR		
R16	" -103A	"		
R17	QRG016J-101	OMR		
R18	QRD187J-103A	CR		
R19	" -103A	"		
R20	" -102A	"		
R21	QRX016J-2R2	MFR		
R22	QRG016J-470	OMR		
R23	QRD187J-393A	CR		
R24	" -393A	"		
C 1	QET41CR-476	E Cap		
C 2	" -107	"		
C 3	QET41HR-105	"		
C 4	–	–		
C 5	–	–		
C 6	PU48635	MP Cap		
C 7	QET41CR-476	E Cap		
C 8	" -107	"		
C 9	QET41HR-105	"		
C10	–	–		
C11	–	–		
C12	PU48635	MP Cap		
C13	–	–		
C14	–	–		
C15	QET41ER-335	E Cap		
C16	" -335	"		
L 1	PU48530-221K	Peaking Coil		
L 2	" -221K	"		
P424	A75802-3	Mini Connector Base		
P425	" -3	"		
P426	A75802-4	Mini Connector Base		
P427	" -4	"		
TP	PU48578	Test Point		TP1–4

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.24 REGULATOR CIRCUIT BOARD ASS'Y 4 4

CR-8250E : PU21485D CR-6650E : PU21485E
CP-5550E : PU21485F

Symbol No.	Part No.	Part Name	Note	Description
IC 1	EHD-RD3243S	Integrated Circuit		
IC 2	EHD-RD3123S	″		
IC 3	UPC7815H	″	□ ⊚	
Q 1	2SD794Q	Transistor		
Q 2	″	″		
Q 3	2SD973R	″		
DA 1	M4B51-12	Diode Array		
DA 2	″	″		
R 1	QRG029J-330G	OMR	□ ⊚	
⚠ R 2	QRZ0054-101	Fusible R		
R 3	QRD167J-684	CR		
⚠ R 4	QRZ0054-101	Fusible R		
R 5	QRD167J-684	CR		
R 6	QRG029J-330G	OMR	□ ⊚	
R 7	QRD167J-103	CR		
R 8	″ -222	″		
C1003	QFE52EM-683M	MM Cap		
C 1	QFH52AM-224	MM Cap		
C 2	QEV71HR-338	E Cap		
C 3	QET41HM-105	″		
C 4	–	–		
C 5	QCF11HP-223	C Cap		
C 6	QET41HM-227	E Cap		
C 7	QFN41HK-104	MY Cap		
C 8	QFH52AM-224	MM Cap		
C 9	QEV71VR-478	E Cap		
C10	QET41HM-105	″		
C11	–	–		
C12	QCF11HP-223	C Cap		
C13	QET41EM-227	E Cap		
C14	QFN41HK-104	MY Cap		
C15	QET41HM-106	E Cap	□ ⊚	
C16	QET41CM-106	″		
C17	″ -106	″		
C18	QET41HM-106	″	□ ⊚	
P441	A75802-3	Mini Housing		
P442	″ -3	″		
P443	PU43351-2R	Cap. Housing		
P444	″ -3	″		
P445	″ -3	″		
P446	″ -2	″	□ ⊚	
P447	″ -2R	″		
P448	″ -3R	″		
P449	″ -2	″		
P450	″ -2Y	″		
P451	″ -6Y	″		
P452	″ -4Y	″		
P453	″ -2	″		
P454	–	–		
P455	PU43351-5	Cap. Housing		
P456	″ -2	″	□ ⊚	
P457	A75802-3	Mini Housing		
P458	″ -3	″		
P459	″ -3	″		
P460	″ -3	″		
P461	″ -3	″		

Symbol No.	Part No.	Part Name	Note	Description
P462	PU43351-2	Cap. Housing		
TP	PU48578	Test Point		TP1–5
	A41096	Tab		
	A44594-001	Fuse Socket		F1–F11
Fuses are not included in PU21485A or PU21485C.				
⚠ F 1	QMF51A2-4R0	Fuse		T 4.0 A
⚠ F 2	″ -5R0	″		T 5.0 A
⚠ F 3	″ -1R25	″		T 1.25 A
⚠ F 4	″ -1R0	″		T 1.0 A
⚠ F 5	″ -1R0	″		T 1.0 A
⚠ F 6	″ -1R25	″		T 1.25 A
⚠ F 7	″ -R63	″		T 0.63 A
⚠ F 8	″ -2R5	″		T 2.5 A
⚠ F 9	″ -R63	″		T 6.3 A
⚠ F10	″ -R63	″		T 6.3 A
⚠ F11	″ -R40	″		T 0.4 A
⚠ F12	″ -2R0	″		T 2.0 A

□ symbol: CR-8250E only ⊚ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.25 SYSTEM CTL BOARD ASS'Y 5 0

CR-8250E PU21466C-3
CR-6650E, CP-5550E PU21466D-3

Symbol No.	Part No.	Part Name	Note	Description
IC 1	M54519P	Integrated Circuit		
IC 2	TC4081BP	"		
IC 3	UPD553C-235	"	□	
	" -236		◉ ☆	
IC 4	UPC78L05	"		
IC 5	TD62703P	"		
IC 6	UPD4584BC	"		
IC 7	LM6416E-131	"		
IC 8	UPC1458C	"		
IC 9	HA17555PS	"		
IC10	TMS1025N2LL	"		
IC11	TC4066BP	"		
IC12	TMS1025N2LL	"		
IC13	—	—		
Q 1	2SD636Q,R	Transistor		
Q 2	"	"		
Q 3	"	"		
Q 4	"	"		
Q 5	"	"		
Q 6	2SA564Q	"		
D 1	1SS133	Diode		
D 2	"	"		
D 3	"	"		
D 4	"	"		
D 5	TLS124	LED		
D 6	1SS133	Diode		
D 7	"	"		
D 8	"	"		
D 9	RD2.4EB	Zener Diode		
D10	RD6.8EB2	"		
D11	1SS133	Diode		
D12	"	"		
D13	"	"		
D14	"	"		
D15	"	"		
D16	"	"		
D17	"	"		
D18	"	"		
D19	—	—		
D20	1SS133	Diode		
D21	"	"		
D22	"	"		
D23	"	"		
D24	"	"		
D25	"	"		
R 1	QRD167J-472	CR		
R 2	" -472	"		
R 3	" -472	"		
R 4	" -472	"		
R 5	" -472	"		
R 6	" -472	"		
R 7	" -222	"		
R 8	" -103	"		
R 9	" -472	"		
R10	" -105	"		
R11	" -102	"		
R12	QRD167J-104	CR		
R13	" -104	"		
R14	" -472	"		
R15	" -472	"		
R16	" -222	"		
R17	" -563	"		
R18	" -222	"		
R19	" -152	"		
R20	" -182	"		
R21	" -104	"		
R22	" -681	"		
R23	" -103	"		
R24	" -104	"		
R25	" -103	"		
R26	" -683	"		
R27	" -561	"		
R28	" -104	"		
R29	" -104	"		
R30	" -103	"		
R31	" -103	"		
R32	" -222	"		
R33	" -104	"		
R34	" -104	"		
R35	" -103	"		
R36	" -472	"		
R37	PU50306-202	VR		V. THRESHOLD ADJ.
R38	PU52108-330K	Posistor		
R39	QRD167J-821	CR		
R40	" -474	"		
R41	" -104	"		
R42	" -103	"		
R43	" -222	"		
R44	" -222	"		
R45	" -222	"		
R46	" -222	"		
R47	" -222	"		
R48	" 100	"		
R49	" -104	"		
R50	" -102	"		
R51	" -104	"		
R52	" -105	"		
R53	" -104	"		
R54	" -104	"		
R55	" -103	"		
R56	" -104	"		
R57	" -684	"		
R58	" -331	"		
R59	" -472	"		
R60	" -104	"		
R61	" -104	"		
R62	" -472	"		
R63	" -563	"		
R64	" -472	"		
R65	" -393	"		
R66	" -103	"		
R67	" -102	"		
R68	" -103	"		
R69	" -224	"		
R70	" -103	"		
R71	" -104	"		
R72	" -104	"		
R73	" -221	"		
R74	" -221	"		
R75	—	—		

□ symbol: CR-8250E only ◉ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
R76	QRD161J-104	CR		
R77	" -104	"		
R78	" -104	"		
R79	" -472	"		
R80	" -104	"		
R81	" -103	"		
R82	QRD167J-101	"		
R83	" -104	"		
R84	" -104	"		
R85	" -104	"		
RA 1	EXB-P88104M	Resistor Array		
RA 2	"	"		
RA 3	EXB-P84104M	"		
RA 4	"	"		
RA 5	EXB-P88104M	"		
RA 6	EXB-P86104M	"		
RA 7	EXB-P88104M	"		
RA 8	EXB-P84104M	"		
RA 9	EXB-P88104M	"		
RM 1	EXB-RB7103M	Resistor Module		
RM 2	"	"		
RM 3	"	"		
RM 4	"	"		
RM 5	EXB-RB7222M	"		
RM 6	EXB-RB7472M	"		
RM 7	EXB-RB7222M	"		
RM 8	"	"		
RM 9	"	"		
RM10	–	–		
RM11	EXB-RB7222M	Resistor Module		
RM12	"	"		
C 1	QCF11EZ-472	C Cap		
C 2	QCS11HJ-121	"		
C 3	" -471	"		
C 4	QCF11EZ-472	"		
C 5	QFN41HK-103	MY Cap		
C 6	" -823	"		
C 7	" -103	"		
C 8	QCF11EZ-472	C Cap		
C 9	QFN41HK-104	MY Cap		
C10	QET41CM-226	E Cap		
C11	QCF11EZ-472	C Cap		
C12	" -472	"		
C13	" -472	"		
C14	" -472	"		
C15	" -472	"		
C17	" -472	"		
C17	" -472	"		
C18	–	–		
C19	–	–		
C20	–	–		
C21	QFN41HK-182	MY Cap		
C22	QEC81CM-227	E Cap		
C23	QCF11EZ-103	C Cap		
C24	" -472	"		
C25	" -472	"		
C26	QCS11HJ-101	"		

Symbol No.	Part No.	Part Name	Note	Description
C27	QCS11HJ-101	C Cap		
C28	QFN41HK-102	MY Cap		
C29	QET41CM-476	E Cap		
C30	" -106	"		
C31	" -106	"		
C32	" -107	"		
C33	QEN41HM-474	C Cap		
C34	QEK41HM-224	E Cap		
C35	QCF11EZ-103	C Cap		
C36	" -103	"		
C37	" -103	"		
C38	" -103	"		
C39	QEK41HM-474	E Cap		
CF 1	PU50224	Ceramic Filter		
CF 2	PU54060	"		
S 1	PU52930	Push Switch		RESET
S 2	PU52476-108	Dip Switch		
RL 1	PU53885	Relay		
	PU47093	IC Socket		for IC 3
P501	PU43351-7	Cap. Housing		
P502	" -6R	"		
P503	" -12Y	"		
P504	" -5Y	"		
P505	" -7R	"		
P506	" -6	"		
P507	" -4	"		
P508	" -3	"		
P509	" -12Y	"		
P510	" -10	"		
P511	" -12	"		
P512	" -2	"		
P513	" -2R	"		
P514	" -5Y	"		
P515	" -2Y	"		
P516	" -2	"		
P517	" -4R	"		
P518	" -2	"		
P519	" -10Y	"		
P520	" -10R	"		
P521	" -7R	"		
P522	" -4Y	"		
P523	" -2	"		
P524	" -2	"		

□ symbol: CR-8250E only ⊙ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.26 SYSTEM CONTROL DRIVE CIRCUIT BOARD ASS'Y 6 0 .... PU21477A

Symbol No.	Part No.	Part Name	Note	Description
IC 1	TMS1025B2LL	Integrated Circuit		
IC 2	M54543L	"		
IC 3	"	"		
IC 4	M54519P	"		
IC 5	"	"		
IC 6	"	"		
IC 7	M54533P	"		
IC 8	"	"		
IC 9	TC4011BP	"		
Q 1	2SD636Q,R	Transistor		
Q 2	2SD313D,E	"		
Q 3	2SB641R,S	"		
Q 4	"	"		
Q 5	2SA1020,Y	"		
Q 6	"	"		
Q 7	"	"		
Q 8	"	"		
Q 9	"	"		
Q10	"	"		
Q11	2SB751Q	"		
Q12	2SC2655Y	"		
D 1	RD11EB3	Zener Diode		
D 2	RD6.8EB2	"		
D 3	1SS133	Diode		
D 4	"	"		
D 5	"	"		
D 6	"	"		
D 7	"	"		
D 8	"	"		
D 9	"	"		
D10	"	"		
D11	"	"		
D12	"	"		
D13	RD6.8EB2	Zener Diode		
D14	1SS133	Diode		
D15	"	"		
D16	"	"		
D17	"	"		
D18	"	"		
D19	"	"		
D20	"	"		
D21	"	"		
D22	"	"		
D23	"	"		
D24	"	"		
D25	"	"		
D26	"	"		
D27	"	"		
D28	WO3C	"		
D29	"	"		
D30	"	"		
R 1	QRD167J-272	CR		
R 2	" -683	"		
R 3	" -331	"		
R 4	" -103	"		
R 5	" -333	"		
R 6	" -333	"		
R 7	" -333	"		
R 8	" -473	"		

Symbol No.	Part No.	Part Name	Note	Description
R 9	QRD167J-103	CR		
R10	" -222	"		
R11	" -222	"		
R12	" -222	"		
R13	" -222	"		
R14	" -222	"		
R15	" -222	"		
R16	" -222	"		
R17	" -222	"		
R18	" -123	"		
R19	" -123	"		
R20	" -472	"		
R21	" -104	"		
R22	" -223	"		
R23	" -104	"		
R24	" -222	"		
R25	" -222	"		
R26	" -684	"		
R27	" -563	"		
R28	" -104	"		
R29	" -102	"		
R30	" -473	"		
R31	QRG019J-820S	OMR		
R32	" -820S	"		
R33	QRG029J-330G	"		
R34	QRD167J-222	CR		
R35	" -222	"		
R36	" -222	"		
R37	" -333	"		
C 1	QET41HM-476	E Cap		
C 2	QET41CM-476	"		
C 3	QCF11EZ-472	C Cap		
C 4	" -472	"		
C 5	QET41CM-476	E Cap		
C 6	" -476	"		
C 7	" -476	"		
C 8	QET41HM-106	"		
C 9	QET41EM-107	"		
C10	QFN41HK-104	MY Cap		
C11	" -104	"		
C12	QCF11EZ-472	C Cap		
C13	QEN41HM-105	NP Cap		
C14	QET41CM-106	E Cap		
C15	" -106	"		
C16	" -106	"		
C17	" -336	"		
C18	QCS11HJ-330	C Cap		
RM 1	EXB-RB7222M	Resistor Module		
RA 1	EXB-P84473M	Resistor Array		
RA 2	"	"		
L 1	PU30284-1R	Choke Coil		
P601	PU43351-5	Cap. Housing		
P602	–	–		
P603	PU43351-2R	Cap. Housing		
P604	" -3	"		
P605	" -12Y	"		
P606	" -12	"		
P607	" -7R	"		
P608	" -2R	"		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
P609	PU43351-2	Cap. Housing		
P610	〃 -4R	〃		
P611	〃 -4Y	〃		
P612	〃 -2R	〃		
P613	〃 -2	〃		
P614	〃 -12Y	〃		
P615	〃 -2Y	〃		

8.27 START/END LED CIRCUIT BOARD ASS'Y 7 0

Symbol No.	Part No.	Part Name	Note	Description
	PU52311	Printed Board		
	NJL1102L	LED		
	PU51115	LED Holder		
	SPSP2008Z	Screw		

8.28 A/C HEAD CIRCUIT BOARD ASS'Y 7 1

Symbol No.	Part No.	Part Name	Note	Description
	PU48531	Printed Board		
P711	PU43351-103	Cap. Housing		
P712	〃 -106	〃		
P713	〃 -104	〃	□ ◎	

8.29 REEL FG CIRCUIT BOARD ASS'Y 7 2 .... PU33592A

Symbol No.	Part No.	Part Name	Note	Description
PC 1	GP-1A01	Photo Coupler		
PC 2	〃	〃		
R721	QRD147J-222	CR		
R722	〃 -222	〃		
P721	PU43351-106	Cap. Housing		
P722	〃 -102	〃		
P723	〃 -104	〃		
P724	〃 -102	〃		
	PU48437	PC Holder		
	PU48438	Plate		
	SPSP3010Z	Screw		
	NNS3000N	Nut		

8.30 MIC JACK CIRCUIT BOARD ASS'Y 7 3
CR-8250E, CR-6650E PU53343A
CP-5550E PU53343B

Symbol No.	Part No.	Part Name	Note	Description
	PU53343	Printed Board		
J731	QMS6302-108	Headphone Jack		
J732	PU51574	Mic Jack	□ ◎	
J733	〃	〃	□ ◎	

8.31 LEFT OPERATION CIRCUIT BOARD ASS'Y 7 4 .... PU33594A

Symbol No.	Part No.	Part Name	Note	Description
	PU33594	Printed Board		
R741	QRD141J-821	CR		
R742	〃 -821	〃		
R743	〃 -821	〃		
R744	〃 -821	〃		
S742	QSL2313-002	Lever Switch		AUTO MODE
S743	〃	〃		AUD. MON.
S744	〃	〃		VIDEO MODE
S745	QSL2218-111	〃		SYNC.
S746	PU48688	Push Switch		RESET
P741	PU49215-7	Cap. Housing		

□ symbol: CR-8250E only　　◎ symbol: CR-6650E only　　☆ symbol: CP-5550E only

8.32 RIGHT OPERATION CIRCUIT BOARD ASS'Y $\boxed{7}\boxed{5}$

CR-8250E PU48657A
CR-6650E PU48658A
CP-5550E PU48659A

Symbol No.	Part No.	Part Name	Note	Description
D 1	MA150	Diode	□ ◎	
D 2	″	″	□ ◎	
D 3	″	″	□	
D 4	″	″	□	
D 5	″	″	□	
D 6	″	″	□	
D 7	″	″	□	
D 8	″	″		
D 9	″	″		
D10	″	″		
D11	″	″		
D12	″	″		
LED 1	LN217RP	L.E.D.	□ ◎	
LED 2	″	″	□ ◎	
LED 3	–	–		
LED 4	LN217RP	L.E.D.	□	
LED 5	″	″	□	
LED 6	″	″	□	
LED 7	″	″	□	
LED 8	″	″		
LED 9	″	″		
LED10	″	″		
LED11	″	″		
LED12	″	″		
LED13	″	″		
R 1	QRD142J-681	CR	□ ◎	
R 2	″ -681	″	□ ◎	
R 3	–	–		
R 4	QRD142J-681	CR	□	
R 5	″ -681	″	□	
R 6	″ -681	″	□	
R 7	″ -681	″	□	
R 8	″ -681	″		
R 9	″ -681	″		
R10	″ -681	″		
R11	″ -681	″		
R12	″ -681	″		
R13	″ -681	″		

8.33 HOUSING JUNCTION BOARD ASS'Y $\boxed{7}\boxed{6}$

.... PU48584A

Symbol No.	Part No.	Part Name	Note	Description
	PU48583	Printed Board		
P761	PU43351-104	Cap. Housing		

8.34 AUDIO LEVEL SELECT CIRCUIT BOARD ASS'Y $\boxed{7}\boxed{7}$

CR-8250E, CR-6650E PU33764A
CP-5550E PU33764B

Symbol No.	Part No.	Part Name	Note	Description
	PU33764	Printed Board		
R771	QRD167J-273	CR	□ ◎	
R772	″ -302	″	□ ◎	
R773	″ -273	″	□ ◎	
R774	″ -302	″	□ ◎	
R775	QRD141J-131	″		
R776	″ -122	″		
R777	″ -122	″		
R778	″ -131	″		
S771	QSS2201-031	Slide Switch	□ ◎	
S772	″	″		

8.35 INPUT SELECT SW CIRCUIT BOARD ASS'Y $\boxed{7}\boxed{8}$

CR-8250E, CR-6650E PU53959A

Symbol No.	Part No.	Part Name	Note	Description
	PU53959	Printed Board	□ ◎	
	QSL2318-002	Lever Switch	□ ◎	

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.36 REEL SAFETY CIRCUIT BOARD ASS'Y 8 1 .... PU33691A

Symbol No.	Part No.	Part Name	Note	Description
IC 1	–	–		
IC 2	TC4011BP	Integrated Circuit		
IC 3	LM6416E-131	"		
IC 4	M54519P	"		
IC 5	UPC78L05	"		
Q 1	2SD636Q,R	Transistor		
D 1	RD2.4EB	Zener Diode		
D 2	"	"		
R 1	–	–		
R 2	–	–		
R 3	–	–		
R 4	–	–		
R 5	–	–		
R 6	–	–		
R 7	QRD167J-472	CR		
R 8	QRD141J-102	"		
R 9	QRD167J-104	"		
R10	QRD141J-102	"		
R11	" -104	"		
R12	QRD167J-105	"		
R13	QRD141J-102	"		
R14	QRD167J-104	"		
R15	" -222	"		
R16	QRD141J-563	"		
R17	" -563	"		
R18	" -222	"		
R19	QRD167J-104	"		
R20	–	–		
R21	–	–		
R22	QRD141J-821	CR		
R23	" -821	"		
R24	QRD167J-333	"		
R25	" -822	"		
R26	QVP4A0B-103	VR		SEN. ADJ. (START)
R27	QRD121J-390	CR		
C 1	–	–		
C 2	–	–		
C 3	QCS11HJ-101	C Cap		
C 4	" -101	"		
C 5	QCF11EZ-472	"		
C 6	" -472	"		
C 7	QET41HM-474	E Cap		
C 8	QET41EM-106	"		
C 9	" -106	"		
C10	QCF11EZ-473	C Cap		
C11	" -103	"		
RA 1	EXB-P84104M	Resistor Array		
P810	PU43351-104Y	Cap. Housing		
P811	" -104Y	"		
P812	" -6	"		
P813	" -4R	"		
P814	" -12Y	"		
P815	" -2R	"		
P816	" -109	"		
P817	" -102	"		
P818	" -5	"		
P819	" -102Y	"		
CF 1	PU54060	Ceramic Filter		

8.37 COUNTER CIRCUIT BOARD ASS'Y 8 2 .... PU21646B

Symbol No.	Part No.	Part Name	Note	Description
IC 1	–	–		
IC 2	TC4001BP	Integrated Circuit		
IC 3	"	"		
IC 4	UPD554C-058	"		
IC 5	UPD550C-055	"		
IC 6	TC4029BP	"		
D 1	1SS133	Diode		
D 2	–	–		
D 3	1SS133	Diode		
D 4	"	"		
D 5	RD8.2EB2	Zener Diode		
D 6	1SS133	Diode		
R 1	QRD167J-103	CR		
R 2	" -104	"		
R 3	" -223	"		
R 4	" -222	"		
R 5	" -102	"		
R 6	" -222	"		
R 7	" -124	"		
R 8	" -103	"		
R 9	" -104	"		
R10	" -103	"		
R11	" -684	"		
R12	" -473	"		
R13	–	–		
R14	QRD167J-105	CR		
R15	" -473	"		
R16	" -473	"		
R17	" -104	"		
R18	" -473	"		
R19	" -105	"		
R20	" -103	"		
R21	" -6R8	"		
R22	" -6R8	"		
R23	" -102	"		
R24	" -103	"		
R25	" -104	"		
R26	" -104	"		
R27	" -101	"		
R28	" -330	"		
C 1	QEN41HM-105	NP Cap		
C 2	QFN41HK-122	MY Cap		
C 3	QEN41HM-105	NP Cap		
C 4	–	–		
C 5	QCS11HJ-121	C Cap		
C 6	" -471	"		
C 7	QET41EM-226	E Cap		
C 8	QCF11EZ-472	C Cap		
C 9	QCS11HJ-221	"		
C10	QET41EM-107	E Cap		
C11	QCF11EZ-472	C Cap		
C12	" -472	"		
C13	QET41EM-226	E Cap		
C14	QCS11HJ-121	C Cap		
C15	" -471	"		
C16	QCF11EZ-472	"		

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

Symbol No.	Part No.	Part Name	Note	Description
C17	QET41HM-475	E Cap		
C18	QFN41HK-104	MY Cap		
C19	〃 -123	〃		
L 1	PU30284-1R	Choke Coil		
CF 1	PU50224	Ceramic Filter		
CF 2	〃	〃		
RA 1	EXB-P88104M	Resistor Array		
RA 2	EXB-P88334M	〃		
RA 3	EXB-P88334M	〃		
	PU51171	DC-DC Converter		
P821	PU43351-2R	Cap. Housing		
P822	〃 -4	〃		
P823	〃 -5Y	〃		
P824	〃 -8R	〃		
P825	〃 -9	〃		
	PU48979	Shield Case		
	PU34204	〃		
	PU34205	〃		
	PU34206	〃		
	PU50776	Test Pin		

8.38 FLUORESCENT DISPLAY CIRCUIT BOARD ASS'Y 8 3 . . . . PU53837A

Symbol No.	Part No.	Part Name	Note	Description
	PU53837	Printed Board		
	PU53884	FIP		

8.39 JUNCTION BOARD ASS'Y 8 4

CR-8250E, CR-6650E PU33702A
CP-5550E PU33702B

Symbol No.	Part No.	Part Name	Note	Description
Q841	2SC2647C	Transistor		
Q842	〃	〃		
D841	MA150	Diode		
D842	RD2.4EB	Zener Diode		
R841	QRD167J-822	CR		
R842	〃 -333	〃		
R843	〃 -821	〃		
R844	〃 -103	〃		
R845	〃 -103	〃		
R846	PU50306-103	VR		TAPE END DET.
⚠ R847	QRZ0054-390	Fusible R	□ ◎	
⚠ R848	〃 -390	〃	□ ◎	
⚠ R849	〃 -390	〃	□ ◎	
R850	QVZ3506-681	VR	□ ◎	VIDEO LEV.
C841	QET41HR-474	E Cap		
C842	QET41CM-336	〃		
C843	QCF11EZ-223	C Cap		
C844	QEK41HM-224	E Cap		
P841	PU43351-4R	Cap. Housing	□ ◎	
P842	〃 -2R	〃	□ ◎	
P843	〃 -4	〃	□ ◎	
P844	〃 -2	〃	□ ◎	
P845	〃 -2	〃	□ ◎	
P846	〃 -9	〃	□ ◎	
P847	〃 -2	〃		
P848	〃 -2Y	〃		
P849	〃 -2Y	〃		
P850	—	—		
P851	PU43351-4Y	Cap. Housing	□ ◎	
P852	—	—		
P853	PU43351-4	Cap. Housing	□ ◎	
P854	〃 -3R	〃	□ ◎	
P855	—	—		
P856	PU43351-12	Cap. Housing		
P857	〃 -12R	〃		
P858	〃 -10Y	〃		
P859	〃 -10	〃		
TP	PU50766	Test Pin		TP1

□ symbol: CR-8250E only ◎ symbol: CR-6650E only ☆ symbol: CP-5550E only

8.40 HOUR METER BOARD ASS'Y $\boxed{8}\boxed{6}$

.... PU54991A

Symbol No.	Part No.	Part Name	Note	Description
	PU54991	Printed Board		
Q 1	2SB6410	Transistor		
Q 2	2SC1545B	"		
D 1	RD2.4EB	Zener Diode		
D 2	1SS133	Diode		
D 3	"	"		
DA 1	UPA64H	Diode Array		
DA 2	"	"		
DA 3	UPA54H	"		
DA 4	"	"		
DA 5	UPA64H	"		
DA 6	"	"		
DA 7	UPA54H	"		
DA 8	"	"		
DA 9	"	"		
DA10	"	"		
DA11	UPA64H	"		
DA12	"	"		
DA13	UPA54H	"		
DA14	UPA64H	"		
DA15	"	"		
DA16	UPA54H	"		
R 1	QRD167J-223	CR		
R 2	" -103	"		
R 3	" -103	"		
R 4	–			–
R 5	QRD167J-393	CR		
R 6	" -473	"		
C 1	QCF11HP-103	C Cap		
C 2	QET41CM-336	E Cap		
C 3	QCF11EZ-223	C Cap		
C 4	" -223	"		
	PU49133	Hour Meter		
	PU44449	Meter Seal		

8.41 ADDRESS FULL ERASE HEAD CIRCUIT BOARD ASS'Y(FULL ERASE ONLY) $\boxed{8}\boxed{8}$ PU53915A

Symbol No.	Part No.	Part Name	Note	Description
	PU5248	Printed Board		

8.42 AUDIO LIMIT SW CIRCUIT BOARD ASS'Y $\boxed{8}\boxed{9}$

CR-8250E, CR-6650E PU53337A

Symbol No.	Part No.	Part Name	Note	Description
	PU53337	Printed Board	□ ◎	
	QVG4W2A-014A	VR	□ ◎	

8.43 AUDIO TRANS CIRCUIT BOARD ASS'Y $\boxed{9}\boxed{0}$

CR-8250E, CR-6650E PU33596A
CP-5550E PU33596B

Symbol No.	Part No.	Part Name	Note	Description
T901	PU43676	Input Trans.	□ ◎	
T902	"	"	□ ◎	
T903	PU52359	Output Trans.		
T904	"	"		
T905	"	"		
R901	QRD167J-102	CR		
R902	" -222	"		
P901	PU43351-4	Cap. Housing	□ ◎	
P902	" -4R	"		
P903	" -2Y	"		
P904	" -2	"		
P905	" -3	"	□ ◎	
P906	" -3R	"	□ ◎	
P907	" -3	"		
P908	" -3R	"		
P909	" -3Y	"		
P910	" -2R	"		

8.44 FRAME SW CIRCUIT BOARD ASS'Y CR-6650E, CP5550E $\boxed{9}\boxed{1}$ FRAME SW CIRCUIT BOARD ASS'Y CR-8250E $\boxed{9}\boxed{7}$

Symbol No.	Part No.	Part Name	Note	Description
	PU50290	Printed Board	◎ ☆	
	PU54823	"	□	
	QSS4301-004	Slide Switch	□	
	QSS2201-031	"	◎ ☆	

8.45 VIDEO LEVEL CIRCUIT BOARD ASS'Y $\boxed{9}\boxed{2}$

CR-8250E, CR-6650E PU53955A

Symbol No.	Part No.	Part Name	Note	Description
	PU53955	Printed Board	□ ◎	
R921	QRD167J-681	CR	□ ◎	
R922	QVG4W2B-013V	VR	□ ◎	MANUAL

8.46 CONNECTOR CIRCUIT BOARD ASS'Y $\boxed{9}\boxed{5}$

.... PU33597A-1

Symbol No.	Part No.	Part Name	Note	Description
	PU33597-1-1	Printed Board		
R951	QRD167J-750	CR	□ ◎	
R952	" -750	"	□ ◎	
R953	" -750	"		
R954	QRD141J-100	"		
R955	QRD167J-750	"	□	
S1011	QSS2201-031	Slide Switch		

□ symbol: CR-8250E only   ◎ symbol: CR-6650E only   ☆ symbol: CP-5550E only